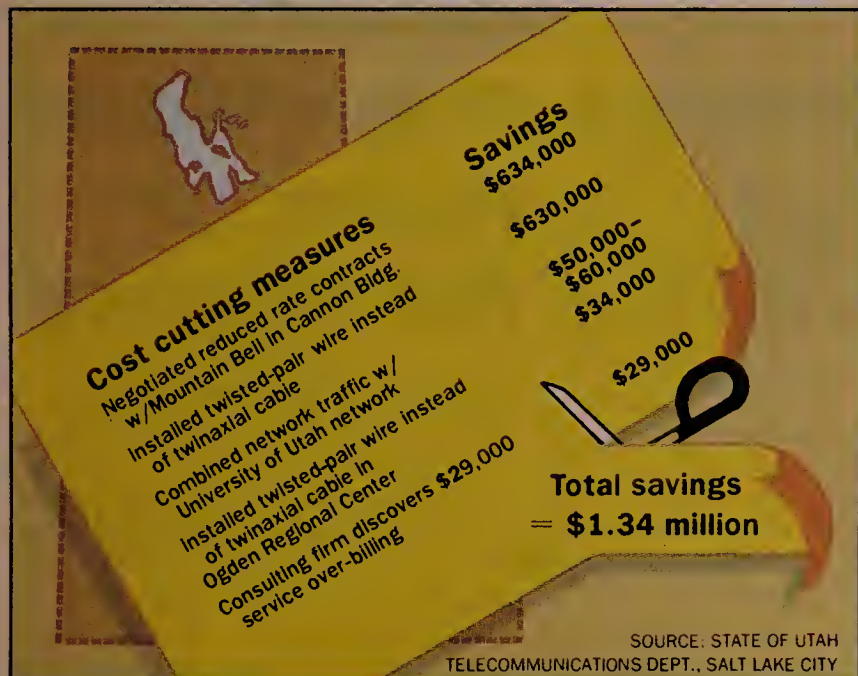


State of Utah's network cost-cutting measures



STATE BUDGETS

Utah belt-tightening moves squeeze \$1.3m in savings

Twisted pairs and BOC deal pare network costs.

BY BOB WALLACE
Senior Writer

First of a three-part series.

SALT LAKE CITY — Faced with a possible \$12 million to \$23 million state budget deficit, Craig Jorgensen embarked on a series of innovative steps that may slash network expenses by roughly \$1.3 million this year alone.

Jorgensen, director of Utah's telecommunications network, is one of a growing number of communications professionals

who have been forced to cut networking costs in response to the recent and drastic downturn in energy prices. As energy-related revenue and, consequently, state budgets shrink, communications networks are bearing the brunt of austerity measures.

In trimming the state's telecommunications costs, Jorgensen helped negotiate a contract with Mountain Bell covering intrastate long-distance calls, which may save Utah \$634,000 annually. Idaho and Colorado have entered into similar state

See Utah page 39

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 3, NUMBER 16

JUNE 23, 1986

BIG BLUE BARRAGE

IBM beefs up flaccid minicomputer line

Heralded 3274 successor bows, micro-mainframe link strategy revealed. See stories, page 5.

BY PAUL KORZENIOWSKI
Senior Writer

NEW YORK — IBM last week launched a massive retaliatory attack on its office systems competitors with the release of more than 100 products, the bulk of which are aimed at shoring up the communications capabilities and perfor-

mance of its mid-range systems — the soft underbelly of IBM's processor line.

In what may have been the company's largest product barrage ever, IBM responded in a big way to competitive pressures and the demands of its office systems users. IBM claimed to have fulfilled some 65 user-submitted requests for

See System/36 page 5

DELIVERY DELAYS

System 75 users stranded

BY NADINE WANDZILAK
Staff Writer

Users of AT&T Information Systems' popular System 75 mid-range private branch exchange have become victims of its success. System 75 users that have placed orders for supplemental and replacement parts, such as circuit boards and consoles, have been left empty-handed and angry as demand for such components has outstripped supply.

In April 1984, AT&T introduced the System 75, which can simultaneously transmit voice and data over the same line at up to 64K bit/sec, as a "flagship product for medium-sized

See System 75 page 6

NETWORK LINE

News

Sun Microsystems, Inc. will introduce tomorrow an MS-DOS Implementation of its Network File System, which provides users with transparent access to files across networks. Page 2.

Dutiful Sen. Robert Dole sponsors, at the Reagan ad-

ministration's prompting, legislation that would hand the Bell regulatory reins over to the Federal Communications Commission. Some users groups and trade organizations are speaking out against it. Page 3.

CWA members are expected to be back on the job this week, thanks to a tentative agreement reached last week between the union and AT&T. Page 4.

The vulnerability of fiber-optic based communications networks was illustrated last week when saboteurs cut two AT&T cables in San Bernardino, Calif., wiping out service to several large companies for nearly a day. Page 4.

Features

Staying on top of software copyright laws can prove essential. Sometimes ignorance is not bliss, and becoming ensnared in an intellectual property suit will leave users feeling far from sanguine. Page 35.

Flexible enough to handle current needs and support future growth, microcomputer-based local-area networks have really made a mark on the communications scene. Page 31.

FEATURE FOCUS

The beauty of artful integration

Blending graphics into video.

BY JEFFREY ROTHFEDER
Special to Network World

Fifteen years ago, internal communications at Mary Kay Cosmetics, Inc. began to sag, so corporate officials decided it was time for a make-over. They instituted the Communication Center concept, a one-hour powwow of the company's brain trust. The weekly sessions at the firm's Dallas headquarters are used to inform more than 100 managers about some 200 ongoing projects, covering a range of

Continued on page 28

► CORPORATE NETWORKS

Amex verging on network supremacy

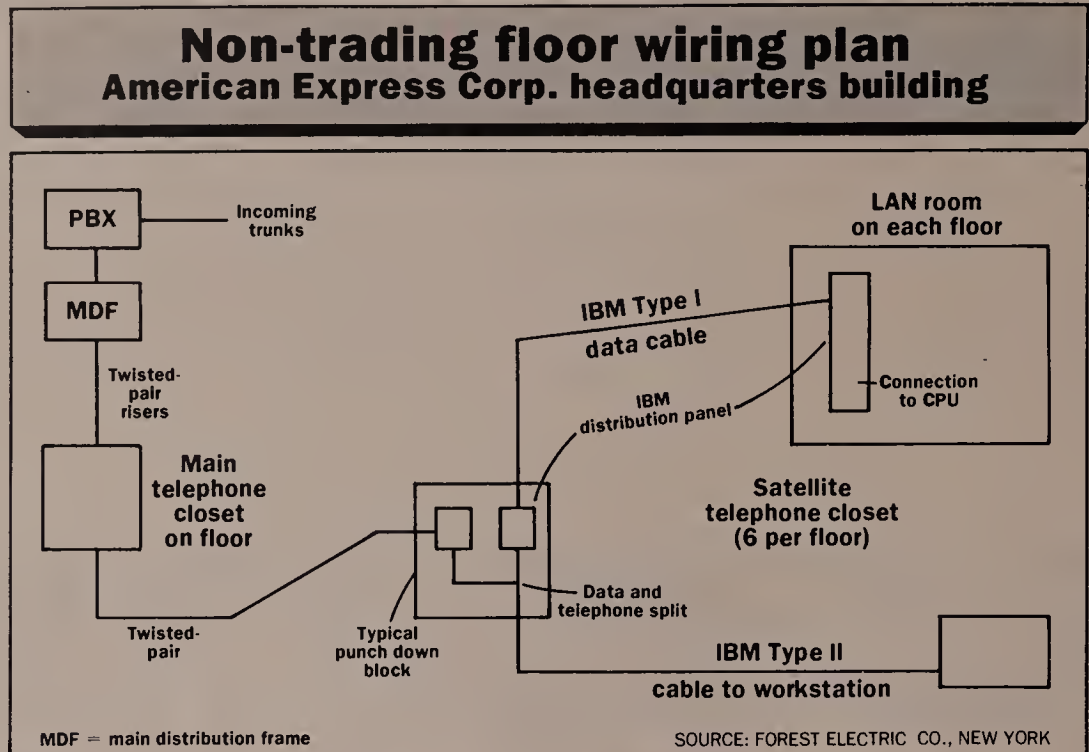
BY SHARON SCULLY
Senior Editor

NEW YORK — American Express Co., one of the world's largest financial services companies, might, if it so chooses, be not just its own phone company, but yours as well.

According to sources inside the company, that prospect is "obvious if you look at what we've got here."

What they've got includes an AT&T 5ESS premises-based central office switch, a number of AT&T Dimension private branch exchanges, 2,600 miles of fiber-optic cabling that reaches the desktops of 2,500 traders and 20,000 voice/data lines on IBM cabling. American Express also has plans to link its main data processing facilities nationwide on its own fiber-optic network.

Last October, the company occupied a new 52-story headquarters building here. It is the largest single-tenant office building in the world, with the highest concentration of fiber-optic cabling and the biggest population of traders at any location worldwide.



But what is pointing the company in the direction of becoming its own phone company is more than just its New York network design. During the past five years, American Express has bought the second-largest financial services institution on Wall Street, Shearson & Co. Shearson, in turn, bought Lehman

Brothers, one of the world's largest investment bankers. The resulting combination, Shearson-Lehman Brothers, gave American Express a wholly owned financial services subsidiary second in size only to Merrill Lynch & Co.

Moreover, the company three
See **American Express** page 39

► LOCAL NETS

Sun widens realm of file service

BY MARY PETROSKY
West Coast Correspondent

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. tomorrow is expected to introduce PC-NFS, the first implementation of its Network File System (NFS) for Microsoft Corp.'s MS-DOS environment. PC-NFS, which Sun Microsystems initially implemented on Ethernet networks, runs on IBM Personal Computers and compatibles and provides them access to files on any other computer using NFS.

NFS, one of a series of network services from Sun Microsystems, cuts across computer equipment from different vendors to give network users transparent access to files spread across a network. To date, NFS has been implemented in various versions of Unix, including Berkeley 4.2 and AT&T System V.2, as well as in Digital Equipment Corp.'s VMS operating system.

PC-NFS allows a personal computer to act as a client, not a server, so other network users cannot directly access files residing on the personal computer. However, micro users can configure PC-NFS to automatically send local files to a network server, making these files common to all network users.

Sun Microsystems chose to give micro users client status only because PC-NFS' main purpose is to provide a method of connecting micros to other systems, according to Jane Howland, group manager of product marketing for Sun Microsystems' East Coast Division. "There are other ways to simply cluster PCs," Howland said, adding that client status lets micro users maintain private files.

Sun Microsystems will also announce a coprocessor board that enables Sun Microsystem workstations to run MS-DOS applications in a window under Unix. In addition, the company has announced that 20 additional computer manufacturers have licensed NFS. Since its introduction in 1984, a total of more than 40 vendors and 20 universities worldwide have licensed NFS. New licensees include Hewlett-Packard Co., Harris Corp., Ridge Computers Co. and French computer vendors Bull and CSEE, as well as Toshiba Ltd. and NEC Corp., the first Japanese vendors to support NFS. Previously announced licensees include DEC, Data General Corp. and Texas Instruments, Inc.

Despite the large number of licensees, fewer than a dozen vendors are now shipping NFS implementations, according to Bill Keating, product line manager for operating system and networking with Sun Microsystems. Since NFS is incorporated within an operating
See **Sun** page 39

► INTERNETTING

The lure of linking LANs

Users seek to tie isolated local nets.

BY MARGIE SEMILOF
Senior Writer

First in a three-part series on linking local-area networks.

When communications managers dutifully installed individual local-area networks to satisfy specific user applications, they probably never envisioned that one day they would need to link those networks.

Today, however, managers are faced with increasing user demand for networks that allow them to

share information throughout the corporation, rather than just locally. Thus, managers are looking for ways to link isolated and often incompatible local net products. They must also consider a local net's connectability — how easily it can be linked to other networks — when making purchasing decisions.

Most users initially bought local networks to share expensive resources, such as line printers, between multiple processors, or to tie processors together to allow users to share information.

Although they are used to tie personal computers, minicomputers or mainframes together, departmental personal computer networks currently outnumber all other types of local nets.

Ideally, users would initially purchase and implement local-area networks based on similar architectures. But that is not always possible or even advisable considering the application the net is intended to address. So, as user demand for access to corporate information increases in proportion to user sophistication, managers are confronted with the need to link a diverse array of networks.

The task of linking similar local networks, such as two Ethernet networks that use carrier sense multiple access with collision de-

See **Linking local nets** page 8

Table of contents

TOP NEWS

IBM shores up sagging mid-range processor line. **Page 1.**

The state of Utah tightens its belt and saves \$1.3 million. **Page 1.**

Users of AT&T's System 75 PBX have become victims of its success. **Page 1.**

Sun Microsystems is expected to unleash an MS-DOS version of its Network File System. **Page 2.**

INDUSTRY UPDATE

Trends in the CO switch market warrant user scrutiny. **Page 9.**

TELECOM TRENDS

DMW Software's second version of TelePoll reaps call detail data. **Page 11.**

DATA DELIVERY

IBM sees profit in OSI support. **Page 15.**

FACTORY COMMUNICATIONS

SME chief Donald Zook says U.S. manufacturers must change their approach to implementing new technology. **Page 17.**

COMMUNICATIONS MANAGER

Communications managers are taking advantage of cost-cutting steps. **Page 19.**

NEW PRODUCTS AND SERVICES

Datacomm Management Sciences unveils a network monitoring system. **Page 21.**

FEATURES

The communications staff at Mary Kay Cosmetics blends computer graphics and video to enhance teleconferences. **Page 1.**

► REGULATORY RECKONING

Senate gets Dole bill

Reagan backs proposal for FCC control.

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Legislation was introduced in the U.S. Senate last week that would transfer regulatory control of the Bell operating companies from the Department of Justice and U.S. District Court Judge Harold H. Greene to the Federal Communications Commission.

The Federal Telecommunications Act of 1986 was introduced by Senate Majority Leader Robert J. Dole (R-Kan.) upon the urging of the Reagan administration. The White House is hoping to see all telecommunications policy controlled by a single entity — the FCC. Although the bill has the administration's backing, a number of user and trade organizations have expressed opposition to it.

The 50-page bill ("Bill poses FCC control," *Network World*, June 16) would consolidate, in the FCC, responsibility for all federal telecommunications policy, including the Justice Department-issued AT&T and GTE Communications Corp. consent decrees that have governed the U.S. telecommunications industries since 1982. According to a statement issued by Dole, the legislation would "take the provisions of the consent decrees, charge the FCC to issue regulations incorporating these provisions and empower the commission to administer them."

Since the court-ordered breakup of the Bell System in 1982 and AT&T's divestiture of the seven regional Bell operating companies, the Justice Department and Greene have controlled the lines of business in which the BOCs could participate.

The AT&T decree currently prohibits the RBOCs from manufacturing and operating outside their geographic areas. They cannot compete in new markets without Justice Department review and court approval.

"The decree is unique in the annals of antitrust jurisprudence," Dole said. "It set up a separate regime of federal telecommunications regulation that competes with an already established federal agency — the FCC." The competition between the FCC and Justice "has mired the industry in confusion," Dole said.

The complex telecommunications issues that face regulators today go far beyond antitrust considerations, with which Justice is concerned, according to Dole. "They affect foreign trade, jobs and consumer choice. They fundamentally affect the future of high-tech America," he said, adding "The courts, unlike the FCC, cannot legitimately take into account such things as our trade balance, national security and local service in administering regulations."

The Justice Department has taken a surprisingly favorable stance toward the proposed legislation. In a statement issued by Douglas H. Ginsburg, assistant attorney general in charge of the antitrust division, Justice seems ready to relinquish its role as a telecommunications policy setter.

"Senator Dole is to be congratulated," he said. "I wholeheartedly endorse the legislation, as does the administration. My colleagues in

the administration and I will actively work for its passage."

Dole staffers and Justice collaborated on a memorandum that explains the constitutional ramifications of such a transfer of authority. In his statement, Ginsburg said, "The Federal Telecommunications Policy Act of 1986 would require the FCC to promulgate and enforce new federal regulations identical in substance to the antitrust consent decrees."

In a recent speech at Georgetown University, Greene said he was pleased with the legislative action. But Greene expressed concern over the FCC's ability to regulate the giant telecommunications companies given the agency's size and resources. "There is no reason to be-

lieve the FCC could effectively detect and remedy problems of the kind that lead to divestiture," Greene asserted.

A number of groups expressed opposition to the legislation as it is currently written. Opponents included long-distance telephone companies such as AT&T, the American Newspaper Publishers Association, telecommunications equipment vendors and some consumer advocates. Long-distance companies and equipment manufacturers are concerned about BOC competition in their arenas, while user organizations worry that the BOCs may fund new market forays with revenue from basic phone service, a situation they fear could lead to higher telephone rates. ■

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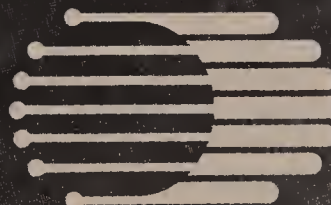
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► SABOTAGE

Fiber-optic cables slashed

BY BOB WALLACE

Senior Writer

SAN BERNARDINO, Calif. — In an incident that illustrates the vulnerability of fiber-optic-based communications networks, saboteurs last week cut two AT&T fiber-optic cables, wiping out private line service to a number of large companies for nearly a day.

According to a communique issued to AT&T media relations managers last Monday, "People entered two manholes in the San Bernardino area and used hacksaws to cut the cable in a way that makes it difficult to repair."

AT&T personnel reportedly discovered the problem shortly after 11 p.m. on Sunday, June 15. The private line services, which operate over both lightwave cables, were not restored until after 5 p.m. the following day.

AT&T spokesman Rick Wallerstein said network traffic running over the two damaged fiber links was rerouted over existing AT&T Communications, Inc. fiber-optic and microwave links.

AT&T would not divulge the names of the companies affected by the attack, but the communique indicated that the firms were major defense contractors.

One of the two damaged cables was part of an AT&T transcontinental fiber route now under development that will eventually link Sacramento, Los Angeles and other California cities with cities in the Midwest and on the East Coast. The 417M bit/sec single-mode fiber link, which currently emanates from Los Angeles and terminates in Phoenix, became operational in mid-March. The second fiber-optic cable emanates here and terminates in Palm Springs, Calif.

In a prepared statement, AT&T said: "We consider sabotage of telephone circuits a very serious matter and are asking the [Federal Bureau of Investigation] and other

authorities to investigate." AT&T spokesman Rick Wallerstein said the San Bernardino County Sheriff's Department is leading the investigation of the incident.

The incident raises serious questions about the use of fiber-optic cable, which has been widely regarded as the most secure communications transmission media. Fiber-optic cable provides telephone companies with the ability to operate numerous high-bandwidth services over a single cable. But, as last week's incident illustrates, network services to multiple users can

also be terminated by severing a single fiber-optic cable.

Donn Parker, senior management consultant with SRI International, Inc. in Stanford, Calif., has researched computer systems security and computer crime for more than 16 years. He said network users who concentrate their communications on a single transmission medium leave themselves vulnerable to such attacks.

"With fiber-optic cable, you see a much higher concentration of information on a single cable. This makes sabotaging these facilities a much easier job," he said. Parker suggested that companies spend the money saved by using fiber-optic cable systems to acquire redundancy to ensure against the possibility of total network failure. □

► NATIONAL COMPUTER CONFERENCE

NCC attendance drops

IBM products highlight bland show.

BY MARY PETROSKY

West Coast Correspondent

LAS VEGAS — With registration down more than 50% from last year, attendees at the National Computer Conference (NCC) last week got the kind of individual attention they never dreamed possible at a trade show. They also witnessed a slew of IBM product announcements that were the high point of an otherwise tepid show (see "IBM beefs up flaccid minicomputer line," page 1).

According to the American Federation of Information Processing Societies (Afiaps), the show's sponsor, approximately 40,000 people registered this year compared with some 85,000 registrants last year. The number of exhibitors dropped from a high of 700 in 1984 to 400 this year. One attendee, surveying the empty floor, said he could not remember the last time he had actually been able to see down the aisles at a major trade show like NCC. Although many show-goers

seemed satisfied to view new products and attend seminars, at least one MIS manager voiced frustration that so few minicomputer vendors were exhibiting.

For the first time in the show's history, the keynote address was given by an executive of a user organization. Robert Crandall, chairman, president and chief executive officer of AMR Corp. and American Airlines, Inc., spoke about the strategic importance of information technology. Throughout his speech, Crandall gave examples of how American Airlines is using computer and communications technology to gain a competitive edge in the airline industry.

In a session on choosing long-distance carriers, AT&T, MCI Telecommunications Corp. and GTE Sprint Communications Corp. tripped over each other assuring users of their commitment to fully digital networks. Much of the discussion focused on rates. AT&T's recent rate cut is forcing many car-

See NCC page 7

► CWA STRIKE

AT&T, CWA reach tentative accord

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T and the Communications Workers of America (CWA) last week reached a tentative contract settlement that was expected to end the union's three-week-old strike. Some 155,000 striking CWA members were expected to be back on the job yesterday.

The settlement coincided with the commencement last week of CWA collective bargaining with the regional and local Bell operating companies on behalf of 300,000 union members.

Finalization of the tentative con-

tract agreement was pending completion of bargaining among six AT&T divisions concerning regional issues. A June 21 deadline had been set for completion of those talks. Union membership is expected to vote on the national contract by July 28.

While the CWA was claiming last week to have won many of its contract demands, industry watchers felt AT&T came closer to meeting its objectives than did the striking union.

The tentative contract calls for an 8% wage increase over three years. The union failed to win cost of living adjustments, which it said was its major goal in bargaining.

Cost of living adjustments will be suspended for the contract period, although the union managed to have AT&T retain the cost of living adjustment language in the contract for future consideration.

The CWA won some major job security provisions from AT&T and managed to win salary protection for a group of highly paid technicians. The provisions include AT&T's agreement that the hiring of outside workers to replace laid off CWA workers would be eliminated when layoffs are taking place and that laid off workers would retain the right of recall. AT&T also agreed to fund a job

See Strike page 8

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"ABC membership
applied for"



ABP

► IBM

3274 successor bows

*Controller falls short of predictions.***BY PAUL KORZENIOWSKI**

Senior Writer

RYE BROOK, N.Y. — Fiction can often be more appealing than fact. Rumors concerning IBM's long-awaited successor to its 3274 controller family turned out to be a bit more enticing than the new line, the IBM 3174, which was announced last week.

The controller did possess a number of significant enhancements, such as a protocol conversion feature, support for Ascii terminals and direct connection to IBM's Token-Ring Network. However, other rumored capabilities, such as IBM's LU 6.2 protocol conversion capability, support for more than 32 logical units and hard disk storage, were not included in the new line.

Along with the new controller, the company announced a new model of its 3299 multiplexer Model 3, which enables 3270 terminals to attach to 3174 and 3274 control units over twisted-pair wiring. Unlike previous models, the 3299 Model 3, which sells for \$795, can directly attach to telephone wiring and does not require a coaxial-to-

twisted-pair adapter. Five new displays and two image scanners were included in the barrage of products unleashed last week.

Seven models of the 3174 line were announced. Four models support up to 32 IBM 3270 series terminals and 24 Ascii terminals. The 3174 Model 1L directly attaches to a mainframe channel and includes an optional Token-Ring Network gateway attachment. The Token-Ring option controls up to 140 devices on a network and could be used to connect a Token-Ring Network to a host without requiring a front-end processor. Network devices resemble Physical Unit 2.0 devices and are unable to support advanced network functions such as IBM's LU 6.2 protocol.

The Model 1R supports RS-232 and CCITT V.35 interfaces. The Model 2R supports an X.21 interface so the controller can be used to connect packet-switching networks to a Systems Network Architecture network. The Model 3R uses an IBM Cabling System interface for a Token-Ring attachment. Smaller versions of the latter three controllers are the Model 51R, Model 52R and

See 3174 page 6

System/36 from page 1

System/36 and System/38 enhancements with the product introductions.

The company also served notice that it has not conceded the integrated office systems market to rivals such as Digital Equipment Corp., Wang Laboratories, Inc. and Data General Corp. Those vendors have gained ground on IBM of late by offering strategic connectivity products, which IBM's portfolio conspicuously lacked.

New networking scheme

Among the introductions was a new networking scheme that enables systems to establish sessions without host intervention. Other key items in the product deluge included enhancements to IBM's Distributed Data Management (DDM), which enables programs residing and executing on one system to use files stored on a second system. Other featured introductions included improved office automation software and a handful of new models of both machines.

A new release of IBM's System Support Program, the operating system for the System/36, includes Application-to-Application Networking (APPN), a facility previously labeled in IBM technical documents as Low Entry Networking. An extension of IBM's Physical Unit 2.1, APPN is the latest step the company has taken to migrate Systems Network Architecture from its hierarchical approach to where it can fully support distributed processing.

Devices and the routes between

them are defined to a System/36 and the other devices connected on a network. A user would then be able to access any node on the network without requiring the intervention of an IBM mainframe. Each device used to route the session passes the session to the next device in peer-to-peer fashion until the end point is reached. The user then has a virtual connection from his terminal to the target system.

The new networking scheme supplies a couple of benefits. First, it off-loads the chore of establishing and maintaining sessions from the host to the System/36, a capability that could enhance host performance. Also, APPN provides users with flexibility to set up departmental networks easily.

However, APPN may create network management and control problems. In a typical SNA network, one system is designated as the network hub, and network management information is funneled back to it.

With APPN, no central management point exists. In last week's announcement, facilities to tie APPN into IBM's existing host network management systems were missing.

Robert Sundstrom, manager of architecture development programs at IBM's Communication Products Division in Raleigh, N.C., said IBM has been experimenting with facilities to link APPN with present SNA network management tools. But he declined to say when and if the facilities would be made available to customers.

Distributed Data Management is one of the first applications to sup-

► MICRO-MAINFRAME

IBM crafts architecture for linking PCs, hosts

BY PAUL KORZENIOWSKI

Senior Writer

RYE BROOK, N.Y. — IBM last week stepped squarely into the microcomputer-to-mainframe link arena and attempted to supply its version of order to the seeming market chaos.

Sales of micro-to-mainframe link products have not met analysts' expectations. Users have been unhappy with current links, which offer inconsistent user interfaces, support access only to specific types of application data and require cumbersome file transfer techniques.

Thus, IBM's newly introduced link architecture, dubbed Enhanced Connectivity Facilities (ECF), is embodied in a set of products designed to please MIS managers as well as users. The architecture features a consistent user and programmer interface and enables users to transfer data between IBM Personal Computers and IBM mainframes running IBM's MVS or VM operating systems.

Analysts questioned how successful IBM would be in attempting to forge a link standard. They noted that the new architecture,

which will not be available until the middle of next year, has a very long lead time. Also, current link users may be unwilling to migrate to the products. But analysts also concede that IBM's stamp of approval can overcome many product deficiencies.

On the host side, ECF gives users access to IBM DB2, SQL/DS, DL/I and Vsam and SAM files. On the microcomputer side, a user is able to work with Data Interchange Format, Lotus Development Corp. WRK and WKS, Ashton-Tate Dbase II and Dbase III, comma-separated variable files and Microsoft Corp. Multiplan files.

The new architecture is embodied in three types of products: requesters, routers and servers. Requesters, which run on a member of the IBM Personal Computer line, enable users to ask for host data or services. Routers on the micro and host supply appropriate communications facilities, such as terminal emulation, that allow a micro and mainframe to communicate. Servers, which run on IBM mainframes, extract and format data so it can be used by a mainframe or a micro.

See Link page 6

port APPN. DDM had been available for the System/36; versions for the System/38 and IBM mainframes, with first quarter 1987 scheduled shipment dates, were added last week.

System/38 enhanced

On the office automation front, the System/38 was enhanced to support Disoss Library Services. Disoss documents can now be stored on a System/38 and be referenced and used by Disoss users on other systems. Previously, Disoss Library Services were supported only on IBM mainframes.

New versions of Displaywrite/36, Personal Services/36 and Query/36 were announced. The enhancements, coupled with upgrades to some Personal Computer programs, were designed to supply a consistent interface and command set for IBM office automation programs that run on various systems.

Users had complained that when they moved from Displaywrite 3, which runs on the IBM Personal Computer, to Displaywrite/36, they were forced to learn a new set of commands.

Also, the company attempted to make it easier for users to store documents on the various systems. For example, a shared folder facility enables a user to store Personal Computer files on a System/36. Users will have to wait for these enhanced services because most will not be available until the end of this year or the beginning of next year.

The company also announced its

first bridge between Disoss and Professional Office System (Profs), an office system that runs under IBM's VM operating system. Personal Services/36 Profs Bridge, which will be available in the second quarter of 1987, will enable System/36 users to share final form or revisable text documents with Profs users.

Also unveiled was the Rolm-bridge 5250 Link Protocol Converter, which enables asynchronous terminals to be tied to a System/36 or System/38 through a Rolm CBX private branch exchange. The converter, which will be available in the fourth quarter of 1986, is available in seven- or 14-port card configurations. Prices range from \$3,075 to \$5,915.

Three models announced

Three new models of the System/36 were announced. IBM said the devices support up to 3½ times as much memory as previous models. IBM also claimed users could expect a 40% performance improvement for data processing applications and a 100% markup for office automation applications. The various models will be available late this year or early next year and will range in price from \$67,850 to \$106,850.

Four models of the System/38 were announced. Users could expect a 30% performance improvement at a 30% lower cost than previous models, according to IBM. Prices for the various models range from \$37,500 to \$385,490, and all models should be available in August. □

Washington Update

BY KARYL SCOTT
Washington, D.C. Correspondent

■ The Senate recently confirmed Patricia Diaz-Dennis as a member of the Federal Communications Commission. She is scheduled to be sworn in on Wednesday for a term that will run until 1989.

Diaz-Dennis, a 39-year-old Democrat from New Mexico, succeeds Henry Rivera on the five-member FCC. Rivera stepped down earlier this year before the conclusion of his term to join a private law firm.

Diaz-Dennis said she was elated when, after almost two months of waiting, she got word that the Senate had confirmed her nomination by President Reagan. While saying she was honored to have been selected for the post, Diaz-Dennis declined to discuss her views on telecommunications policy until after she assumes office.

Diaz-Dennis has been a member of the National Labor Relations Board in Washington, D.C. since 1983. She was appointed to that post by President Reagan. Prior to that, she was an attorney with American Broadcasting Co.'s De-

partment of Labor Relations and Legal Affairs.

■ One of the largest telecommunications users in the country, the federal government thinks local telephone rates may be too high. Acting on behalf of federal agencies, the U.S. Department of Defense and the General Services Administration (GSA) have petitioned 31 state public utility commissions to investigate the authorized rates of return of the Bell operating companies.

The Defense Department and GSA are questioning the current BOC rates of return in light of decreased interest and inflation rates and postdivestiture uncertainty. The agencies argue that in the past year, the BOCs have experienced phenomenal financial success and their rates should be re-evaluated.

■ AT&T last week filed with the FCC to offer users of its Skynet International Service one-hop satellite service from San Francisco and Washington, D.C. to locations in the U.K. and nine other European nations. The company also announced a rate reduction for those

See **Update** page 39

Link from page 5

Servers can work with security packages such as IBM's Resource Access Control Facility. Analysts noted that servers shift control of the link to a mainframe, a situation that may soothe the fears of MIS managers fearful of granting micro users access to mainframe information.

A key component of the new architecture is Server-Requester Programming Interface (SRPI), a program-to-program interface that enables application programmers to write routines to invoke link capabilities. The first release of the product will support Physical Unit 2.0 devices such as dumb terminals. That means micros linked via ECF would appear as dumb terminals to the mainframe, which would control micro-to-mainframe sessions. IBM stated its intention to modify SRPI so it would support more intelligent network services such as IBM's LU 6.2 protocol.

The IBM architecture rivals that of DCA Communications, Inc., whose Irma line of micro-to-mainframe links dominates the link market. Many link vendors have incorporated DCA's architecture in their products.

IBM Personal Computer Requesters cost \$450. On the host, two servers are available. The monthly charge for the IBM TSO/E Server is \$1,350 and for CMS Servers, the charge is \$850. □

3174 from page 5

Model 53R. These models support up to 16 3270 Series devices and eight Ascii terminals.

The 3174 family works with more than 1M byte of storage and up to two 1.5M-byte floppy disk drives. The product supports 64K bit/sec line speeds, compared with 56K bit/sec by the 3274 line.

To support Ascii devices, at least one asynchronous emulation adapter, which supplies eight ports, and an additional 1.5M-byte floppy disk drive are required. The new controller supports Ascii data streams used by terminals such as Digital Equipment Corp.'s VT50 and VT100. Ascii terminals are able to communicate with an asynchronous host in pass-through mode, which simply moves the message from the controller to a port that supplies a connection to an Ascii host.

IBM said that the new product line supports all IBM devices that the 3274 line supported, except for the IBM 3278 terminal. Prices range from \$5,900 for the Model 51R, to \$12,950 for the Model 1L. Option prices range from \$500 for a multiplexer adapter, to \$5,000 for the Token-Ring Network gateway. Some models of the 3174 are currently available; others will not be shipped until May 1987. Shipments of various 3274 controllers will continue until the complete 3174 line is available. □

System 75 from page 1

clients." Initially designed for installations of up to about 300 lines, the system can now accommodate up to 800 lines. The System 75 was offered on a limited basis in the third-quarter of 1984 and became generally available later that year.

The success of the System 75 has surprised even AT&T, said Ian Angus, president of the Angus Telemanagement Group in Toronto. While AT&T will not reveal the number of System 75s currently installed, analysts estimate the figure to be between 3,500 and 5,000. But the PBX's success has tested customers' patience.

Charles Gibson is one of the people who have faced difficulties obtaining System 75 components. In April, Gibson placed a supplemental order for System 75 circuit boards.

Gibson, a consultant with International Project Management Group, a telecommunications consulting firm in Glyndon, Md., said AT&T's response was "no improvements to System 75s for 14 weeks." The wait irked him and his client, who had purchased the system in November 1985 and cut over in March of 1986.

What angered Gibson and his client was knowing that new System 75s were being delivered that contained the cards he had ordered. One particular card, a direct inward dialing card, has been available for at least two years, according to Gibson. "It should be right on hand," he said. "If you bought a car, you'd assume it would have spark plugs and that there would be extras on the shelf."

AT&T's response to the wait for the supplemental order also annoyed Gibson. "AT&T said, 'If you don't like the wait, take the system out,'" he said.

Even obtaining replacement cards for a System 75 took two weeks, rather than overnight as AT&T claims, Gibson griped. Three of the original cards in Gibson's System 75 were defective and had to be replaced, he said.

The Signal Capital Corp. of Hampton, N.H., part of the Henley Group, ordered its second System 75 in May, with cutover scheduled for Labor Day, according to telecommunications specialist Deborah Draper. She, like other users interviewed by *Network World*, likes the System 75. But when their first System 75 needed a replacement circuit pack, "AT&T was unable to accommodate us for one month," she said. In the interim, "We were losing calls left and right," she added.

A System 75 was installed in Arthur Young & Co.'s Houston office in April, according to Gina Miller, facility management supervisor. Getting replacements for damaged parts took seven to 10 days, she said. And, when Arthur Young wanted to buy a second console for the PBX, AT&T refused to quote a lead time on the order, citing as a reason the Communications Workers of America's strike against the company. Arthur Young decided to lease the console from AT&T, a process that will still take four to five weeks, she said.

Arthur Young purchased 16 System 75s the day the system was unveiled. Eventually, some 23 System

75s will be linked in a nationwide network. Miller said the switch is "fabulous. We can see now how limited we were with the Dimension PBX we had before." The System 75 had the software Arthur Young needed and was the only phone system of its size that offered the routing capabilities Arthur Young wanted.

Why the delay for supplemental and replacement orders for the System 75? Michael Oyster, System 75 product manager, said the wait resulted from the success of the System 75 and the way AT&T apportioned system components. Orders for the system backlogged. "At one point when we were trying to meet customer service demands for systems, we gave [new] systems a priority over additions," Oyster said. "If somebody's moving to a new building, you want to give them service rather than provide somebody else a little growth capacity." At that time, the wait for a supplemental circuit pack, for example, was 14 to 18 weeks, he said.

Users have been telling AT&T that they have to wait as long for one supplemental circuit pack for a System 75 as for a whole new system, Oyster said. So, effective June 2, AT&T implemented a new order interval for supplemental orders. That means the wait between when an order is transmitted into the AT&T system to the time the order arrives at the user's site is four weeks. Oyster suggests that users add one more week for installation.

As a precursor to the four-week order interval, Oyster said AT&T had to invest in manufacturing capacity to build enough circuit

packs and systems to meet the demand.

The order interval for a full System 75 is down to between nine and 11 weeks, Oyster said.

With a scarcity of components, the "squeaky wheels" or larger users have gotten their orders, further delaying other users' deliveries, several consultants said.

Jim Kennedy, senior communications analyst for Stone & Webster Engineering Corp. in Boston, said his company ordered a Local Storage Unit (LSU) peripheral in January. AT&T gave him a delivery date of January 1987. When he pressured the company, AT&T trimmed the lead time by six months, to July 1986.

"We are a national account of AT&T," Kennedy said. "We are aware that getting the LSU means AT&T is taking from Peter to pay Paul. But charity begins at home."

Stone & Webster recently installed its fourth System 75. The first three System 75s replaced a Dimension system shared by three separate corporate entities in the same building in New York: Stone & Webster, Inc., with about 125 stations; Stone & Webster Management Consultants, Inc., with about 155 stations; and Stone & Webster Engineering Corp., with some 300 stations.

The fourth System 75 was installed in a Stone & Webster project office in Melville, N.Y. The first system, ordered in September of 1985, was delivered in about a year, Kennedy said. By the fourth system, that lead time had been trimmed to between five and six months. □

► NATIONAL NETS

Unknown joins fiber fray

BY MICHAEL FAHEY
Staff Writer

OSWEGO, Ore. — A little-known newcomer to the communications industry has unveiled ambitious plans to establish a nationwide digital fiber-optic network designed to serve large corporate users and interexchange carriers.

Grace Communications, Inc., a subsidiary of Grace Capital Ltd., based here, plans to establish the wholesale fiber-optic network with the goal of becoming "the first national alternative available to major private corporate networks and carriers," said David Johnston, chairman of the board at Grace Capital.

In undertaking the venture, Grace will be competing with established communications giants AT&T, MCI Communications Corp. and GTE Sprint Communications Corp.

In an interview with *Network World*, Robert Grace, president of Grace Capital, said the newly formed company will construct its fiber network by acquiring a number of existing fiber-optic resellers as well as leasing fiber-optic transmission capacity from other resellers. Fiber-optic resellers build and maintain fiber networks and sell transmission capacity to communications carriers.

Two resellers to be acquired

Grace said the company has earmarked \$100 million to purchase resellers along its planned fiber-optic routes. According to Grace, three companies that resell fiber-optic transmission, two of them in the San Francisco area and one in New Jersey, have already agreed to be acquired by Grace Communications. The acquisitions are subject to approval by the shareholders of the resellers.

Grace Capital has also reportedly reached an agreement to acquire National Telecommunications Corp. (NTC) of McLean, Va. Prior to the acquisition by Grace, NTC entered an agreement to lease fiber-optic capacity from Lightnet, Inc., a company owned by Southern New England Telephone Co. and CSX Corp., according to information released by Grace Capital.

However, Debbie Arrington, a spokeswoman for Lightnet, denied that claim, saying her company currently does not have such an agreement with NTC.

Robert Grace declined to reveal the source of Grace Communications' funding, and he would not reveal the names of the interexchange carriers and resellers that his company has already entered into acquisition agreements with or those the company plans to acquire.

Industry analysts expressed skepticism about Grace Communications' stated plan to challenge the giant interexchange carriers in the fiber-optic network market on

the basis of price.

Peter Schapiro, telecommunications analyst for Arthur D. Little, Inc., a Cambridge, Mass.-based consulting company, said Grace Communications' strategy of selling fiber-optic transmission capacity to large corporate users is a risky one.

"Large users have invested tremendous amounts of money in managing private networks, and they are not going to commit that investment to companies whose long-term viability is not certain," Schapiro said. ▮

NCC from page 4

riers, particularly MCI, to stop talking about price and to differentiate themselves on products, service and support.

"We're in the middle of a price war," admitted Don Lloyd, AT&T's division sales manager for Northern California and Nevada. "In the future, we see very little difference on price."

AT&T's Lloyd said a battle between the titans is brewing. "What's coming is a battle between IBM and AT&T over a basic difference of philosophy on network architecture. ISDN is going to be a debate between proprietary and open architectures."

As expected, AT&T used NCC to introduce its new version of Unix V

— Release 3.0 — as well as a Digital Multiplexed Interface for its 3B5 computer ("New Unix version debuts," *Network World*, June 16). Fiber-optic vendor Codenoll Technology Corp. made joint announcements with both 3Com Corp. and Sytek, Inc. involving development of fiber-optic versions of both 3Com's Ethernet network adapter card and Sytek's PC Network adapter card ("Fiber link planned for 3Com network," *Network World*, June 16). Codenoll also announced joint development and marketing of a MAP 802.4-compatible modem with Computrol, a division of Kidde Automated Systems of Ridgefield, Conn. The 5M bit/sec fiber-optic, phase coherent MAP modem is priced at \$1,195. ▮

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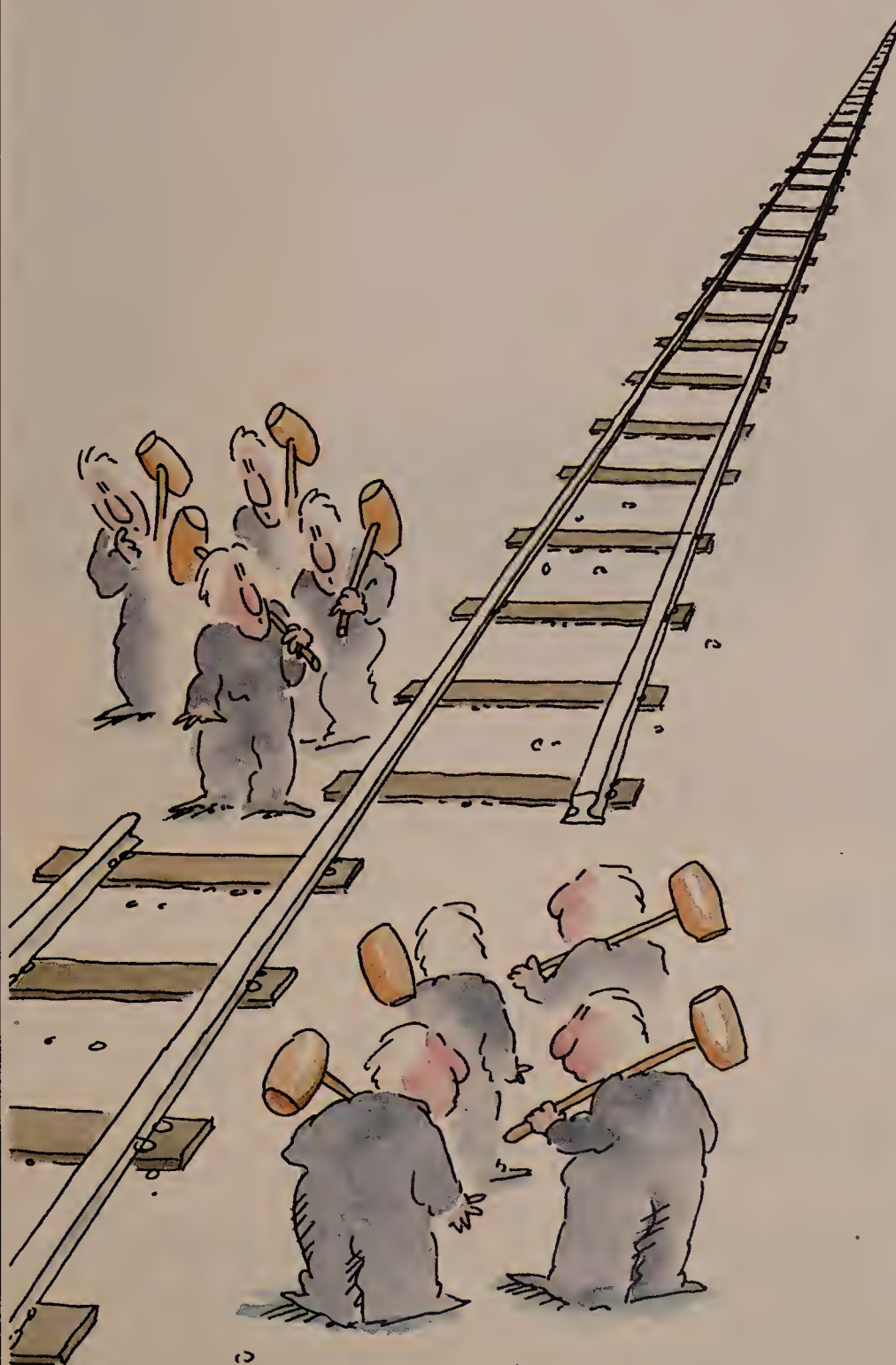
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Linking local nets from page 2

tection (CSMA/CD), is not complex. The networks can be easily connected using bridges, which are devices that physically link two networks, or repeaters.

Compatibility problems arise when users attempt to link networks with different access methods, such as token passing and CSMA/CD. Products that overcome differences in access methods are called gateways.

While gateways can alleviate access method differences, they do not make amends for operating system and file structure differences of network-attached processors.

For example, though users could employ a gateway to tie together Apple Computer, Inc.'s Appletalk

network with an IBM Token-Ring Network, they still would not be able to share information, because Apple's operating system is different from IBM's PC-DOS. Connecting different operating systems requires emulation and conversion products.

Gateways are also used to link dissimilar network environments, such as Digital Equipment Corp. DECnet environments and IBM's Systems Network Architecture.

Another way to link disparate local networks is through network servers. Users, for example, can connect a 3Com Corp. EtherSeries, an IBM Personal Computer network and a Corvus Systems, Inc. Omninet network to a server from Banyan Systems, Inc.

The server runs its own operating system and supports the access method of each type of local network. It does not, however, address operating system compatibility between attached devices. All processors must be PC-DOS compatible.

Paul Callahan, communications manager at the Boston-based Bank of New England, said he has no difficulty linking local-area networks because the company established standards for link-level protocols prior to installing any network products. The goal of the project was to take a layered approach to the architecture and to be able to substitute components.

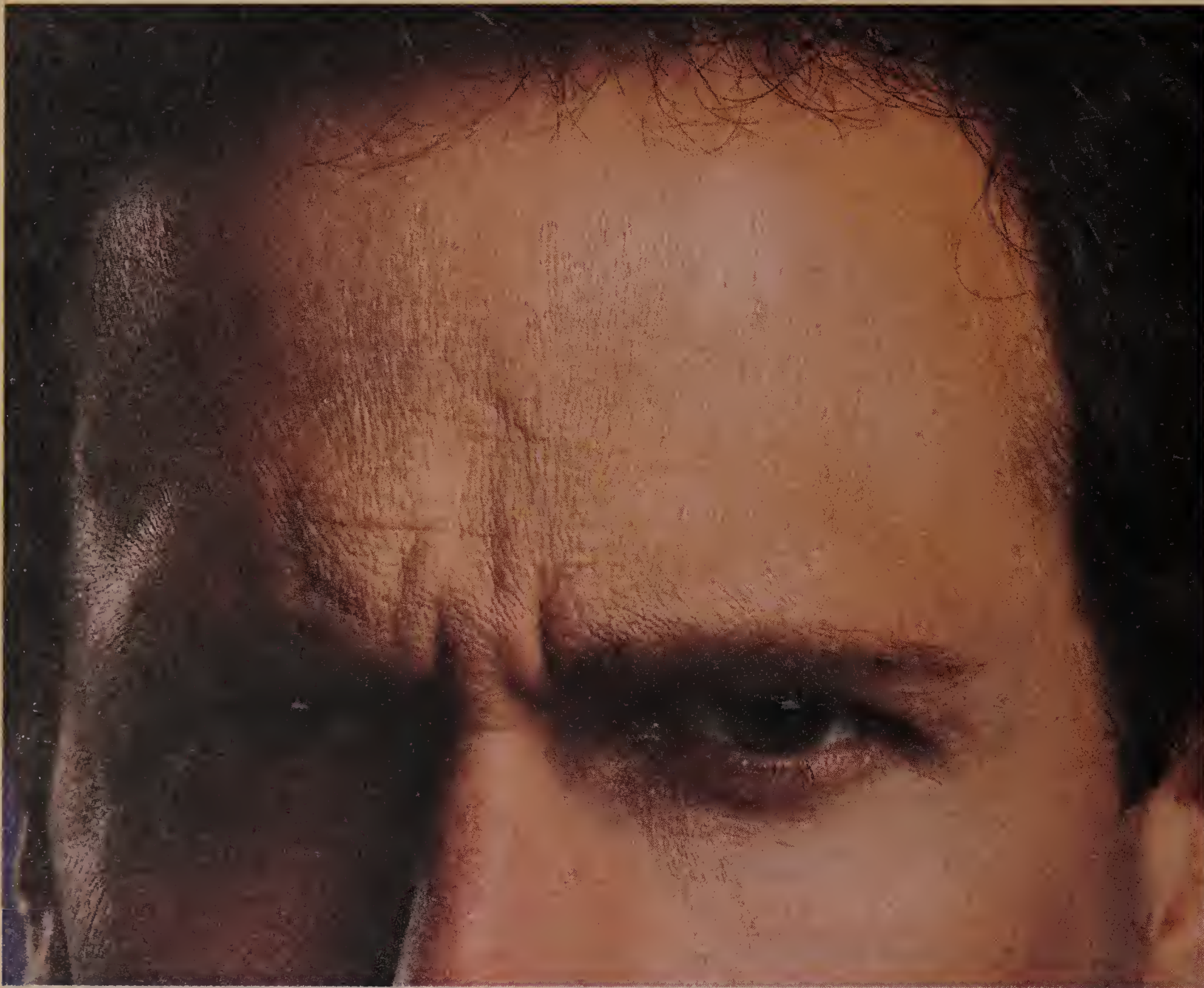
His bank is currently using a server from Banyan Systems and a Proteon, Inc. token-ring network. It

is also evaluating IBM's Token-Ring Network and AT&T's Starlan network.

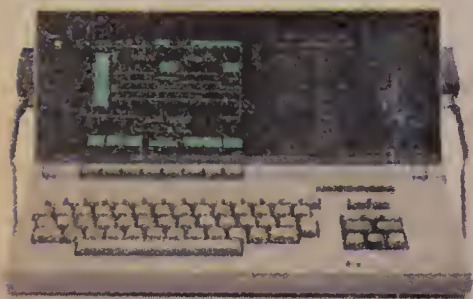
"We were concerned with having hardware independence at the link level so we could consider local network products from the other vendors without disrupting our network growth," he said. "If we find ourselves dealing with another bank that uses a dissimilar link-level protocol like Arcnet, we can easily connect," Callahan said.

"A file server makes it possible to connect these networks. As long as you set your standards up front, tying local networks is easier than it otherwise might be." □

Next week: The ins and outs of bridges and gateways.



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**HEWLETT
PACKARD**

Strike from page 4

training program that will run for the length of the contract. The program, dubbed the Alliance for Employee Growth and Development, will be open to workers with two or more years of employment with AT&T. AT&T will contribute \$7 million annually to the program, which it will run jointly with the union.

Last week, an AT&T spokeswoman diplomatically called the agreement a "win-win situation." The union won higher wages and AT&T gained the ability to be more competitive when bidding for installation contracts, said Edith Herman, an AT&T spokeswoman in Washington.

CWA President Morton Bahr said, "At a time when workers in other industries have been forced to accept contractual givebacks, this tentative contract is significant in that it requires no concessions of CWA members."

Bahr added, "This agreement became possible when the company removed all of its concessionary demands from the bargaining table, and the union made progress in the areas of major concern to our members."

The contract that the CWA has tentatively accepted is similar to the one originally offered by AT&T during collective bargaining in May. It is also similar to the contract the International Brotherhood of Electrical Workers accepted from AT&T without dispute in May. Some observers question whether the loss of three-weeks' wages justified the gains the CWA was touting. Bahr said the strike was not just for immediate gains but for the long-term benefit of workers.

Some analysts expressed surprise over the CWA settlement and suggested that the strike had not affected AT&T's service operations to the extent the union hoped. AT&T responded quickly to the strike, which began June 1, by hiring 5,200 temporary workers and placing 50,000 managers in the jobs of striking workers.

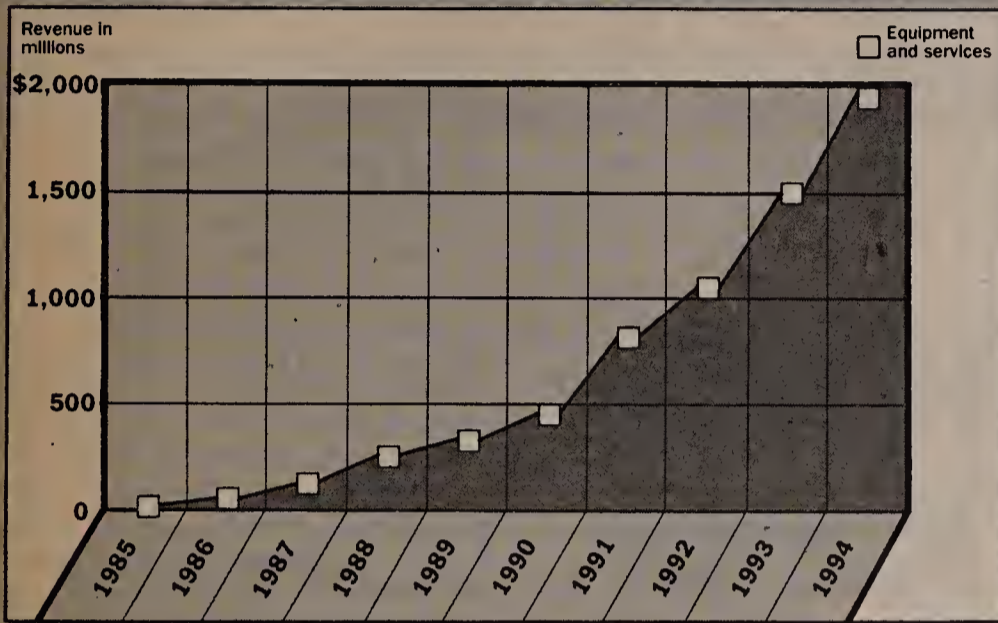
Bahr said at a press conference last week the pressure the striking workers brought to bear upon AT&T caused the telecommunications giant to make concessions to the union. □

INDUSTRY UPDATE

AT&T to sell securities in Eurolira market

AT&T said recently it will raise 100 billion lire, roughly \$65 million, through the sale of securities in the Eurolira bond market. The company will apply to have the securities listed on the Luxembourg exchange, but they will not be sold in the U.S. In announcing the move, AT&T Corporate Vice-President and Treasurer S. Lawrence Prendergast said, "The choice of the Eurolira market for our first nondollar debt issue reflects... our desire to diversify our funding sources to support AT&T's expanded international activities."

Growth of voice processing revenue in Western Europe: Equipment and services



SOURCE: FROST & SULLIVAN, INC., NEW YORK

INDUSTRY EYE SHARON SCULLY

Time for a user voice

Aside from any political motivation Senate Majority Leader Robert Dole (R-Kan.) had in circulating a bill to shift oversight of AT&T divestiture to the Federal Communications Commission, the tactic did serve to raise some interesting issues.

Unfortunately, most of these issues, such as whether, when and how the Bell operating companies will be permitted to offer information services through their monopoly networks, seem hopelessly caught in a web of conflicting bureaucracies.

It is time that users, particularly the growing community of large business users, become more actively involved in the decisions that are affecting how they do business. To do that, they must speak out, calling to task not only their political representation, but such industry machines as the International Communications Association.

Right now, the government bodies deciding which networks should be permitted to deliver information services, such as electronic publishing, cannot even agree on a definition of those services. As a result, the industry is hamstrung in its effort to deploy technology in the public networks that would make information services universally available.

To be fair, it's not a simple issue. In 1982, the FCC issued a

rulemaking known as the Second Computer Inquiry, which defined enhanced services, as "competitive data processing services offered in conjunction with communications services." According to a spokeswoman for Bert Halprin, chief of the FCC's Common Carrier Bureau, the regulators were addressing the concern of cross-subsidization. Consequently, Computer II meant that monopolistic telephone companies could not collocate basic and enhanced services.

But the cross-subsidization concern — to ensure monopoly ratepayers aren't subsidizing competitive enterprises — may be hard to justify in the light of basic business realities. The Uniform System of Accounts by which locally franchised telephone monopolies must keep their books is about as tight as any bookkeeping system could be. And taxpayers are paying the salaries of countless state and federal commissioners to study these numbers before approving tariffs.

But Computer II isn't the only barrier to setting up the public network for the distribution of information services. In 1982, the Bell System was negotiating its final sign-off on the Modified Final Judgment with the U.S. District Court. In exchange for

See **Users speak** page 10

► CENTRAL OFFICE TECHNOLOGY

New advances stir CO battle

800 service market may get crowded.

BY SHARON SCULLY
Senior Editor

Most businesses won't ever consider buying a central office switch. Nonetheless, because almost all businesses depend on these telephone company systems to process and route the lion's share of their voice traffic, trends in this market warrant user scrutiny.

In particular, as a result of the current push toward Integrated Services Digital Networks, around which the Bell operating companies are rallying their efforts to increase data networking revenues, the central office is taking on even greater significance to users.

One key technology currently being deployed in BOC central offices and networks does not even have a

name. But products called signal transfer points (STP), signal control points (SCP) and system service points (SSP) are hot properties in the minds of BOC network planners nationwide. Without them, for example, the BOCs would have to concede to AT&T the estimated \$3-billion 800 service market without even so much as a fight.

Not surprisingly, the lucrative nature of the 800 service market has spurred some vendors, such as Tandem Computers, Inc. and Digital Switch Corp., a subsidiary of DSC Communications Corp., to spend big development dollars designing products to pitch to the nation's local and long-haul carriers ("Firms offer US Sprint an intelligent network," *Network World*, See **Central office** page 10)

► INDUSTRY PULSE

Revenue up, profit down

Study shows earnings down nearly 50%.

BY NADINE WANDZILAK
Staff Writer

ELLICOTT CITY, Md. — While the revenue of 17 leading communications equipment vendors grew in 1985, net income for the group dropped by nearly 50%, according to a study released recently by Newton-Evans Research Co.

Newton-Evans profiled 12 vendors that focus primarily on data communications equipment. The following vendors were profiled: Atlantic Research Corp., Gandalf Data, Inc., General DataComm, Inc., Hayes Microcomputer Products, Inc., Infotron Systems Corp., M/A-Com, Inc., Micom Systems, Inc., Mitel Corp., Motorola, Inc., Paradyne Corp., Racal Electronics plc and Timeplex, Inc. Newton-Evans also studied five companies that it classified as vendors of telecommunications and data communications equipment, including Northern Telecom, Inc., Continental Telecom, Inc. and the related subsidiaries of AT&T, ITT Corp. and GTE Corp.

As a group, the 12 manufacturers increased their revenue from the sale of data communications

equipment by more than 14%, from \$2.4 billion in 1984 to \$2.7 billion in 1985.

Only two of those 12 publicly held companies experienced a loss in revenue. Paradyne suffered the most, dropping to revenue of \$252.5 million in 1985 from \$289.9 million in 1984. Motorola, parent company of Codex Corp. and Universal Data Systems, Inc. suffered a slight drop in corporate revenue during the year.

Of the 10 firms with higher revenue in 1985, four showed increases of more than 25%: Timeplex, up 45.5%; Micom Systems, up 38.8%; Racal Electronics, up 35.6%; and General DataComm, up 26.2%.

Net income for the 17 companies surveyed dropped by 48.5% to slightly more than \$317 million, from 1984's record high of \$616 million, according to the annual study, entitled *Corporate Strategies in the U.S. Computer Industry*.

The 250-page data communications study is priced at \$595 and is available from Newton-Evans Research Co., 10176 Baltimore National Pike, Suite 204, Ellicott City, Md. 21043, (301) 465-7316. □

Central office from page 9
May 26).

However, the BOC market may be tough, even impossible, for these vendors to crack. According to Bell Communications Research, Inc. (Bellcore), the BOCs made their decisions to purchase these systems from Bellcore as far back as divestiture.

According to Ray Bowyer, division manager of network engineering for Bellcore, "This [Bellcore SCP/STP] project began right after divestiture, when the associated [RBOC] companies recognized the need for new network services that could best be provided through an SCP. Specifically, this project is being funded by the seven RBOCs. They've bought it by the fact that

they've authorized it and are paying in advance."

Contrary to claims made by Tandem and Integrated Technologies, Inc., Bellcore said it is not precluded by the Modified Final Judgment from developing an SCP for use exclusively with a Digital Equipment Corp. 8600-based STP.

According to Bowyer, "It is not unclear how far we're permitted to go. It's clear both in the [Modified Final Judgment] and the plan of reorganization [of the divested Bell System] that we can do any software development that our owners authorize. And our software, of course, has to run on hardware that we're not allowed to manufacture."

If true, the claim means that

Tandem, Integrated Technologies and Digital Switch will have to tailor their plans in this area to market only to long-haul carriers and independent local phone companies.

For the BOCs, the deployment of these technologies into their public networks could be slowed by a significant stumbling block. While they plan to begin deploying the Bellcore STPs and SCPs later this year, according to Al Pierro, project manager of Tandem networks for New York Telephone Co., they won't be truly functional until they are able to install the SSPs in the central offices. Only AT&T Network Systems and Northern Telecom, Inc. are now working on SSP software. **■**

Users speak from page 9

not suffering the consequences of being found legally guilty of anti-competitive business practices, AT&T agreed to negotiate a modification to the 1956 Consent Decree. That negotiation resulted in the the Modified Final Judgment, which in essence said AT&T could keep Western Electric and the long-distance network, while the telephone companies could sell customer equipment and provide local-exchange service and access.

The Modified Final Judgment contains language that defines information services. Yet it restricts AT&T from providing such information services as electronic publishing on its long-distance network for a period of at least seven years, and it flatly precludes the local phone companies from participating in their delivery.

The FCC and the U.S. Department of Justice say they both decide when and how the public network will deliver information services. An antitrust task force lawyer at Justice said: "When we modified the consent decree, we prohibited the old Bell System from doing anything that wasn't a regulated communications service. Then we changed that... We said AT&T couldn't do electronic publishing over its own facilities for seven years, and the BOCs could only do local-exchange service and access if they get a waiver from the court.

"But the FCC has regulations dealing with which of the services should be tariffed and regulated. Both AT&T and the BOCs are subject to these regulations. Recently [in the Third Computer Inquiry], the FCC suggested that in certain cases the BOCs may actually provide a number of what have been regarded as enhanced services without structurally separating them within the enterprises that provide the services.

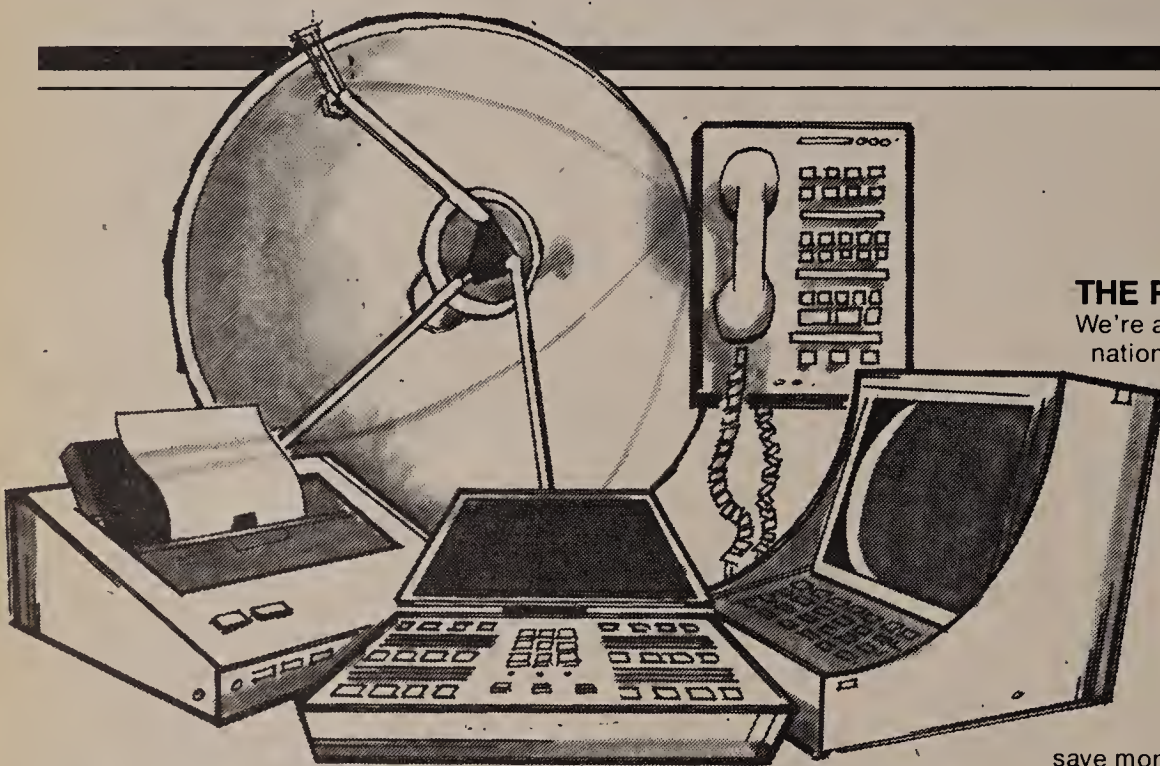
"But of course, that only applies to the services that the BOCs or AT&T may provide under the anti-trust decree, as was always the case."

And according to the FCC spokeswoman: "The divestiture court talks in terms of information services. We talk in terms of enhanced services. The BOCs have been permitted to provide protocol conversion services without a waiver. But anything else that we would consider enhanced, the court will consider an information service and, therefore, subject to the waiver process.

"We can't tell the BOCs they can do something if the court won't permit it. They are permitted to provide basic local-exchange service and, therefore, subject to the waiver process.

Now, as the Dole proposal and other recent rumblings on Capitol Hill attest, the BOCs are rebelling. Not only do they feel they got the short end of the divested Bell System, but some, including US West, Inc. and Ameritech, have filed appeals on the basis of their claim that they never negotiated the Modified Final Judgment in the first place. **■**

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TELECOM TRENDS

MCI reaches out with AT&T 800 service

MCI Telecommunications Corp. is relying on archrival AT&T Communications, Inc. to improve its rapport with customers. Earlier this month, MCI began offering around-the-clock customer service in two regions, representing 20 states, through toll-free 800 service provided by AT&T. Customers in 15 states in MCI's Western division and five Midwestern states around Illinois will now be able to reach MCI 24 hours a day for billing questions, service reports and to receive credit for incomplete calls.

► PBX ADVANCES

System reaps call detail data

BY JOHN DIX
Senior Editor

ANN ARBOR, Mich. — Call detail records gathered at remote private branch exchanges can be automatically collected overnight using the second release of DMW Software, Inc.'s recently updated TelePoll software.

Version 2 of TelePoll improves on the first model by incorporating the ability to run unattended overnight. TelePoll works in conjunction with another DMW product called TeleBox. The microprocessor-based TeleBox attaches to a PBX through an RS-232 port and gathers call detail records. It has 256K bytes of random access memory and can store up to 16,000 call records.

Call detail records include information about the duration of calls, facilities used to complete a call and numbers dialed. A 2,000-line PBX, for example, may generate

8,000 to 10,000 call records per day.

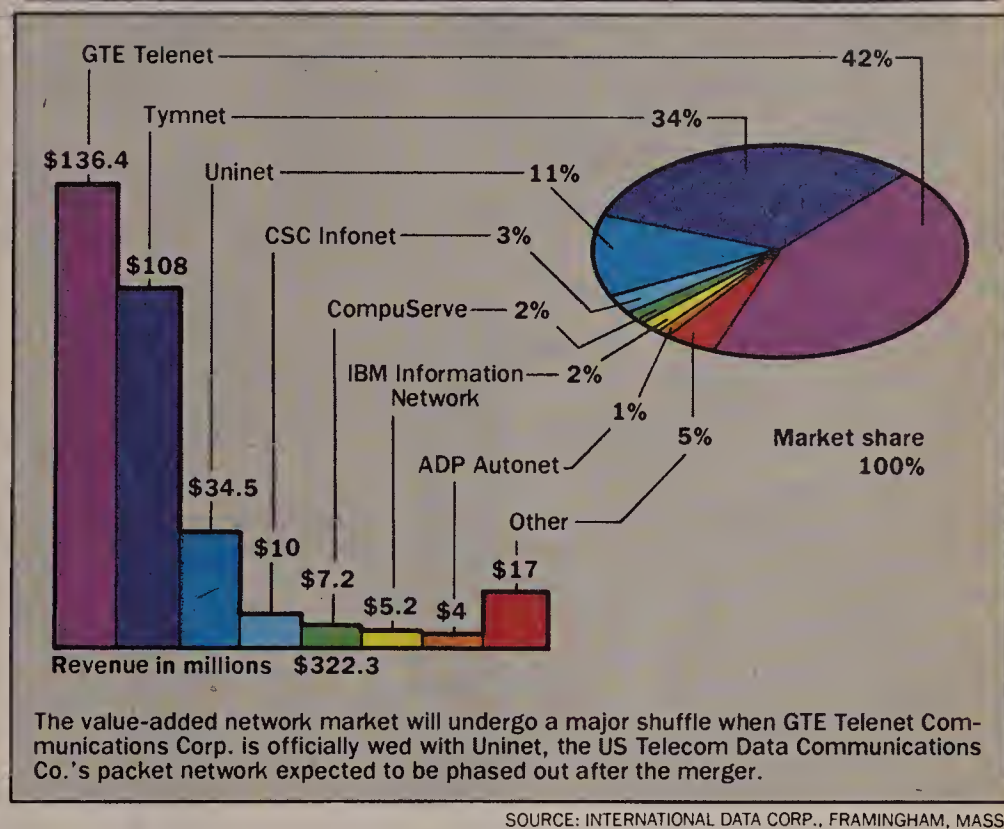
TelePoll can be instructed to wake up at a predetermined time and poll remote TeleBoxes to retrieve the records. Up to 10,000 call records can be retrieved per hour using typical 1,200 bit/sec modems. A TeleBox with the maximum of 16,000 records can be evacuated in roughly an hour and a half, according to Bruce Wilson, director of marketing.

DMW recommends polling switches every night for security and to ensure that PBXs are properly compiling call records.

A multistream version of TelePoll enables up to four PBX links to be operated at the same time, speeding data collection. Wilson said the program treats each link as a task, and checks each port in succession.

Collected reports are stored on hard disk and later passed on to the
See **TelePoll** page 14

Value-added network vendor market share by revenue: 1985



► REPUBLIC TELECOM

Device widens line capacity

BY JOHN DIX
Senior Editor

BOULDER, Colo. — Companies with three or more analog leased lines running between two points may be able to save money using a new line expander from Republic Telecom Systems. It provides up to eight voice circuits over a single 56K bit/sec digital link, or a combination of voice and data circuits.

The RLX-8 is the latest member in Republic Telecom's family of digital line expanders. Line expanders enable customers to squeeze a greater number of voice and/or data channels into the bandwidth of a given communications facility.

The RLX-8 can support eight voice channels on an AT&T 56K bit/sec Dataphone Digital Service or comparable circuit, or six voice channels and one 9.6K bit/sec data channel, or four voice channels and one 19.2K bit/sec data channel.

The RLX-8 can be used for tributary circuits on T-1 networks. It would be possible, for example, to tie a branch office that uses three to eight voice circuits today into a T-1 1.54M bit/sec digital backbone network using a single 56K bit/sec link.

Republic Telecom uses a proprietary technique to digitize and packetize voice that results in an effective transmission rate of 8K bit/sec to 12K bit/sec per voice channel. That compares favorably with industry standard Pulse Code Modulation, which requires 64K bit/sec. According to Republic Telecom marketing analyst Scott Mosley, the speech algorithm removes competitive speech patterns and background noise.

Mosley claims Republic Telecom's speech quality is as good as most standard analog leased lines, even though voice that is digitized using standard 16K bit/sec techniques available today sounds mechanical and somewhat metallic. The system was praised for its voice quality at a demonstration at the recent International Communications Association's conference in Atlanta, Mosley claimed.

The RLX-8 supports synchronous data transmission at speeds up to 9.6K bit/sec or 19.2K bit/sec, and asynchronous communications at speeds up to 9.6K bit/sec. A separate statistical multiplexer can be used with the data channel to achieve multiple 9.6K bit/sec links
See **Republic** page 14

CROSS TALK

JOHN DIX

DMI and ISDN don't mix

Hewlett-Packard Co. made good on a year-old promise last week when it announced a Digital Multiplexed Interface (DMI) for AT&T System 75 and 85 private branch exchanges. The interface, however, uses less than a third of the DMI 1.54M bit/sec bandwidth, bringing into question the short-term viability of such computer-to-PBX connections.

AT&T, developer of DMI, has gathered support for the interface from HP and other computer and switch manufacturers.

Like T-1 transmission services and equipment, the 1.54M bit/sec bandwidth of DMI is divided into 24 64K bit/sec channels, one of which is reserved to carry control signaling needed by all the others.

The intent of DMI — which is competing for industry support with the Computer-to-PBX Interface promulgated by Northern Telecom, Inc. and sup-

ported by others — is to provide a single-wire interface between processors and PBXs. A population of HP terminals, for example, could be tied to a System 85 via its data handling capabilities, and then hitched to an HP 3000 superminicomputer through a single-wire DMI interface.

Here's the rub. HP's implementation of DMI provides support for 23 RS-232 device sessions at speeds up to 19.2K bit/sec.

That speed, a company spokesman said, is adequate for the peripheral needs in the minicomputer world today. It is achieved by bit stuffing the remaining capacity in each of the 23 DMI channels to the full 64K bit/sec. More than a third of the capacity on each channel goes unused.

The inefficient use of capacity may be tolerable for commu-
See **DMI** page 14

Digital
has
it
now.

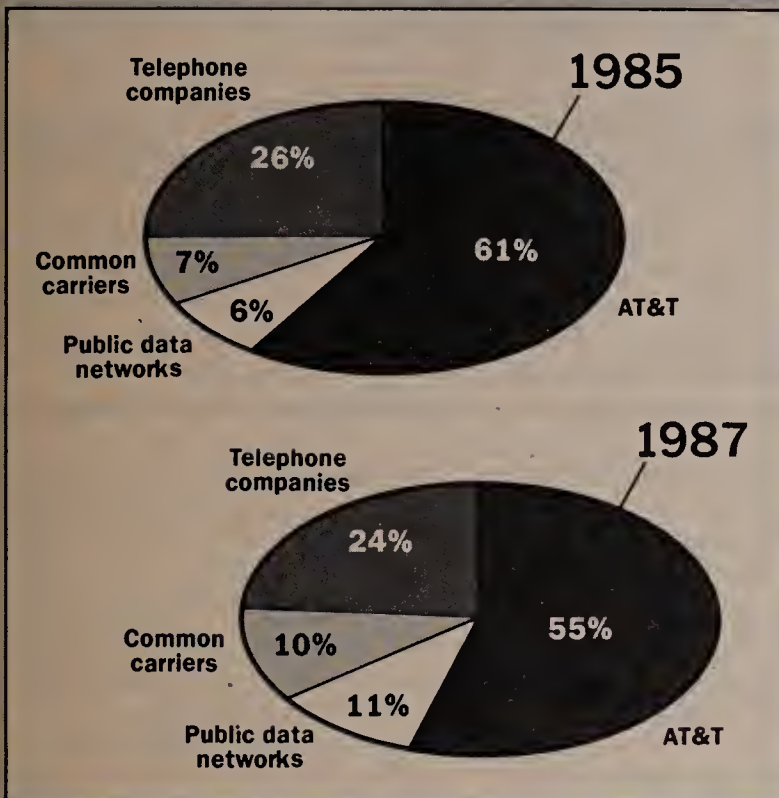


DATA DELIVERY

“IBM will be the first vendor to offer a full-function, seven-layer implementation of the International Standards Organization's Open Systems Interconnect model.

Rudolf Strobl
independent consultant
Framingham, Mass.

Data transmission suppliers 1985 and 1987



SOURCE: NEWTON-EVANS RESEARCH CO., ELLICOTT CITY, MD

STANDARDS

IBM sees profit in OSI support

ISO's model is "industry megatrend."

BY PAUL KORZENIOWSKI
Senior Writer

BOSTON, Mass. — That old dog, IBM, seems to be learning some new tricks, such as how to jump through the International Standards Organization's (ISO) Open Systems Interconnect (OSI) hoops.

When work began on OSI, many analysts and vendors questioned IBM's commitment to any open systems network model. After all, IBM's vast fortune had come from a steadfast commitment to proprietary hardware and software architectures. Traditionally, the company had made it difficult for other manufacturers to attach their

wares to IBM offerings. The company always defended what it perceived as its rightful territory with lawsuits and a never-ending barrage of new products and enhancements. Many analysts predicted that IBM would have to be dragged, kicking and screaming, into the OSI camp.

That characterization of IBM may be off the mark, however. "IBM will be the first vendor to offer a complete, seven-layer implementation of the OSI network model," predicted Rudolf Strobl, an independent consultant based in Framingham, Mass. Strobl is one of a growing number of analysts who have discerned a change in IBM's

See **IBM** page 16

NETWORK LINKS

Gateways look hot

LU 6.2 looms large.

BY TIMOTHY WISE
Special to Network World

Second of a two-part series

Currently, true integration between local- and wide-area networks remains more a promise than a reality. Network management tools are still being developed for local-area networks. Tools that monitor both local- and wide-area networks have not yet been developed. Gateways may represent the first step toward a unified network environment.

A well-implemented gateway facilitates dialogue between a local-area network and a wide-area network. To work properly, a gateway has to supply the user with a seamless link.

Currently, gateways between IBM's Systems Network Architecture and Network Basic I/O System (Netbios) typically work with IBM 3270 series terminal emulation and transform a personal computer into a terminal. This type of gateway

See **Gateways** page 16

Wise is vice-president of research at Pathway Designs, Inc., a Natick, Mass., communications software vendor.

DATA DIALOGUE

PAUL KORZENIOWSKI

The quest for complete control

Divestiture ripped away the security blanket that most companies used to cling to whenever network management problems arose. Stripped of AT&T's support, companies began to look to independent vendors to supply them with network management and control tools.

After carefully examining those offerings, corporations realized that no offering came close to performing the functions of the old security blanket. Vendors supplied pieces of the network management puzzle, but not the complete package that users desired. For example, packages from transmission vendors, such as the modem manufacturers, did an adequate job of monitoring how well transmission lines were functioning. Approaches from hardware companies supplied a fairly complete picture of how well matrix switches, hosts and front-end processors were performing. There wasn't one approach that did a good job of supplying both functions.

When users started to demand more complete solutions, vendors were faced with two choices: Supply the necessary tools or lose customers. Not sur-

prisingly, vendors are opting for the first choice.

Transmission vendors are attempting to enhance their offerings. Racal-Milgo, Inc. is reportedly hard at work on a new network management system, code-named Sunrise. Other manufacturers, such as Codex Corp., are probably doing the same.

Hardware vendors are also making their wares more robust. In March, Avante-Garde Computing, Inc. announced Net/Command, a network management system that works with its network management tools as well as those from IBM and Codex. T-bar, Inc. is busily working to incorporate performance management into its network management offerings.

The market is obviously very competitive, and IBM has never been the type of vendor to back down from a challenge. It appears that the industry giant understands that the company that supplies network management tools may ultimately control the network.

Last month, IBM announced Netview, a network management package that will make both the hardware and the transmission vendors sweat. Avante-Garde is the vendor most likely to be

hurt by the IBM announcement. Netview contains a number of features, such as the ability to integrate a number of separate network management packages, that were the linchpins of Avante-Garde offerings.

In addition to Avante-Garde, difficult times may be ahead for transmission network managers such as Racal-Milgo and Codex. Included with the Netview announcement were enhancements to IBM modems. The enhancements should make IBM's transmission network management offerings more competitive. IBM modem diagnostics had been roundly criticized for not supplying as many features as those from traditional modem manufacturers.

A few weeks before the announcement, IBM decided to publish its network management standards, a first for the company. The publishing may make network management vendors even more uncomfortable. The vendors are faced with two choices: They can ignore the documents and continue to supply their own piece of the network management puzzle, or they can incorporate support for IBM standards into their wares.

See **Net management** page 16

IBM from page 15

thinking. Rather than attempting to stem the growing ISO momentum, IBM appears ready to go with the flow.

Earlier this month, Richard Holleman, director of corporate standards at IBM, classified OSI as "an industry megatrend" during a keynote address at the Network Management/Technical Control conference, sponsored by CW/Conference Management Group. The IBM official attempted to drive home the point that IBM is working to open up its Systems Network Architecture network model to support OSI. As evidence of that commitment, Holleman cited IBM's recent X.25 System Network Interconnection announcement, a product that

works with Layers 4 and 5 of the model, and a demonstration in Europe earlier this year in which IBM's Professional Office System was linked to a number of ISO X.400 electronic mail offerings, which conform to the OSI model's seventh layer.

He added that IBM has been supplying ISO with documents to help define some of the OSI model's various layers. Earlier this year, IBM offered its LU 6.2 protocol to the European Computer Manufacturers Association (Ecma) since that group was developing a transaction processing protocol. The committee decided not to include the IBM standard in the proposal. Holleman noted that politics had reared its head in the standards-making process and that some manufacturers were attempting to use the standards organization to protect their own interests.

Two European manufacturers, Siemens AG and N.V. Philips, re-

portedly played major roles in the committee's decision to reject LU 6.2. IBM does not dominate the European market the way the company rules the domestic industry. These European manufacturers were afraid that IBM would use the ISO model to bowl over its foreign competitors.

Strobl said the committee erred by not incorporating the IBM standard into OSI. He noted that IBM was willing to make some very significant changes to LU 6.2 to accommodate the OSI model. The IBM standard works with a number of lower level SNA protocols. IBM's Ecma proposal dealt only with Layer 5 protocols. IBM would not gain an advantage, because like other vendors, Big Blue would have to modify its offerings to support OSI.

Since there were no other established standards with which the group could work, Ecma will have to write one from scratch. That process could require a great deal

of time and may slow the introduction of commercial OSI products.

IBM has admitted that its interest in OSI stems from more than altruism. "If we continue to enhance SNA so other manufacturers can attach to it, then users may decide to use SNA as the central architecture for attaching all their systems," Holleman said.

He added that the notion of a single vendor shop exists only for small companies, and most medium and large companies work with equipment from a variety of vendors. This trend, coupled with the growth of distributed processing, has forced users to wrestle with the problem of tying incompatible systems together. "Some users have written their own code to link various systems," Holleman said.

IBM would like to supply users with that code. It appears that support of the OSI model would be one of the best ways for the vendor to accomplish that objective. **□**

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Net management from page 15

Companies such as T-bar and Codex sell a lot of their wares to users that have IBM hardware. Ignoring an IBM standard may be a good way of losing current customers.

Embracing the IBM standard is not a palatable choice either. Vendors will continually have to prove that their products are significantly better than similar IBM offerings. If they are unable to do that, users may simply shift to an all-Big Blue solution.

Since divestiture, analysts have been predicting rapid growth in the network management market. De-

spite the lofty predictions, companies like Avante-Garde have experienced financial troubles. One reason may be fierce competition because there are a lot of companies competing for a slice of the network management pie. There is nothing to indicate that this situation will cease.

Another reason may be unrealistic market expectations. If users had their choice, they would work with only one network management package instead of the number of packages they are forced to support. The market could actually shrink in the next few years.

During that time, network management companies will have to make some difficult decisions. First, they will have to enhance their offerings to incorporate all types of network management functions. To do this, research and development costs as well as the number of direct competitors will rise. Second, they will have to decide how to compete with IBM, which has set its sights on this market. The choices made will determine winners and losers in the network management game. And don't let anyone kid you; there will be some very big losers. **□**

Gateways from page 15

will exist for some time because 3270 technology has been well tested and provides all the service needed for text transmission.

However, when the need transcends textual data, 3270 technology is not adequate. IBM's LU 6.2 has garnered a lot of attention. However, LU 6.2 still has to compete with a variety of other communications protocols.

Many people will be disappointed by LU 6.2. Expectations are for broad network connections; however, the protocol is limited to direct connections.

Some expect LU 6.2 to mean better file transfers. This will be true only when someone writes better file transfer software, and then, it will only be faster if the data is nontextual. On some IBM systems, LU 6.2 is not even available.

However, LU 6.2 gateways will become popular during the next few years because every computer vendor will offer LU 6.2 compatibility. As this happens, applications can become more protocol independent. Currently, product development teams spend a lot of time solving data protocol issues.

Gateways need to address more than just SNA to Netbios protocol conversion. There are many different networks, such as DECnet, Wangnet, X.25 and the Manufacturing Automation Protocol. An application interface would provide

an application with the same view of the data communications media regardless of whether it is X.25, asynchronous or Binary Synchronous Communications.

As gateways proliferate, issues of managing the global environment become more serious. Most SNA managers can relate countless tales of network failure, downtime and configuration mismanagement.

Gateways introduce different technologies and devices to the host network. These devices will also need to be managed.

As the host network begins to include gateways to various local networks, their resources need to be managed by a scheme similar to that established for wide-area networks. It would be ideal to have tools that monitor the entire network, bridges and gateways included, from any point within the net.

Only pieces of this solution exist today. As discussed, there are several software and hardware tools for monitoring wide-area network performance. Local net vendors are beginning to see the need for such tools and are bringing such products to market. Tools are being developed that report on storage use, file access and disk allocation.

Netbios has its own error collection process where each adapter card keeps track of its error rate. These statistics can be accessed by network management tools. However, some local net hardware im-

plementations cannot provide information needed for Netbios collection and tracking.

While few local-area network vendors have taken advantage of this feature, gateway vendors have used it to offer a network management capability. Gateways are in a good position to offer these services because they can monitor not only the local net but also its connection with the host.

A network management tool implemented from the gateway could interrogate each network node as well as the gateway and the host, to observe, for example, how many users are attached, traffic rate and error rates. However, all network resources must be included for capacity monitoring and planning. Most gateways do not provide information on how the partner network is performing. Control is limited to the direct network.

As personal computer-based local-area net management tools emerge, tools that encompass both the local- and wide-area network environments will evolve. These tools will be network independent. They will be predominantly software, because the various hardware elements already collect statistics that can be interrogated. They will operate on the personal computer-based local net so that the network administrator can access them directly. They will be priced in the \$1,000 range. **□**

FACTORY COMMUNICATIONS

► MANUFACTURING

SME chief: Keep pace or lose race

BY BOB WALLACE
Senior Writer

PEORIA, Ill. — Donald Zook believes the nation's manufacturers must quickly change their approach to implementing technology or suffer the consequences of their complacency in the increasingly competitive global market.

Zook is the current president of the 82,000-member Society of Manufacturing Engineers (SME) and the assistant director of engineering for manufacturing giant Caterpillar, Inc., based here. The 54-year-old organization boasts members from some 70 nations.

SME is a technical organization dedicated to advancing scientific knowledge in the field of manufacturing. The group's primary function is to discover trends and developments in manufacturing and interpret this information for its members. SME offers a cornucopia of manufacturing publications,

conferences, clinics and expositions to its members and other interested parties. SME is best known for serving as the sponsor of the Manufacturing Automation Protocol/Technical and Office Protocol users group.

In an interview with *Network World*, Zook said U.S. manufacturers earn only a grade of C- for their lackadaisical approach to implementing advanced factory technologies (see figure at right). "Some U.S. manufacturing companies will either go under or will come perilously close to failing before they recognize they have to operate differently than they have in the past," he warned.

Zook fired a salvo at the upper management of the country's manufacturing companies. "The single biggest roadblock to modernizing our factories is a lack of commitment to the effort by the management of manufacturing companies." He said many companies do not know how to implement new factory technology effectively. "There

See Zook page 18

“IBM plans to work with [Industrial Networking, Inc.] to develop MAP products, but we will certainly develop some products independently of INI as well.

Richard J. Holleman
director of standards practices
IBM
Purchase, N.Y.

SME Report card

Don Zook, The president of the Society of Manufacturing Engineers, the world's largest manufacturing education organization, rates the following countries on their manufacturers' success in implementing new factory technologies.

Japan
A

"I think the Japanese are super implementors. They have been able to take concepts and implement them quickly in their factories. I think the Japanese are beginning to look over their shoulders at the South Koreans."

S. Korea
B

"South Korea is a fast-comer. South Korea has obtained much technology from other countries. They have low wage rates and they are hungry. South Korea is a factor to be reckoned with now."

U.S.
C-

"I would give American manufacturers a C-. U.S. manufacturing companies have implemented new technologies by evolution. It is very difficult for U.S. manufacturing companies to institute large changes."

W.
Germany

"I don't have a good feel for West Germany's manufacturing efforts. I have great respect for their manufacturers' ability to implement new technologies. They have fallen behind in recent years — not to the degree that the U.S. has — but in comparison with the manufacturers of the Far East."

FACTORY FACTS

BOB WALLACE

Closing the MAP gap

For almost two years, huge manufacturing companies have labored to pilot test the Manufacturing Automation Protocol. The rift between this factory fraternity and the rest of the nation's manufacturing companies has widened considerably.

At times, it seemed medium-sized and small manufacturing companies were being ignored by the mighty MAP movement. Although the MAP users group meetings have been attended by representatives of manufacturing organizations of all sizes, the GMs, the Boeings, the Kodaks and the DuPonts were the ones announcing MAP pilot tests and production implementations.

The MAP/Technical and Office Protocol users group steering committee has taken an important step to close the gap between the large manufacturers and the rest of the manufacturing world. The steering committee gave CIM Data, Inc. of Wellesley Hills, Mass., the green light to conduct the survey.

An in-depth, 10-page survey has been sent to all members of the MAP/TOP users group. The survey is designed to assist the steering committee in developing programs suited to the needs of its members. The results of the survey will be available to all responding companies and will also be summarized at the next MAP/TOP users group meeting on Sept. 15 and 16 in Ann Arbor, Mich.

If all members of the users group complete the 37-question survey, the committee will likely be swept away by a sea of information. Responses to the questionnaire will help the users group get a clearer picture of the plans and needs of its members. The information will also give the committee a better idea of its members' demographics.

Much of the survey is geared to collect information on the nature of the company's business, its size, the equipment it uses in the factory and its intentions on implementing MAP or TOP

See Survey page 18

INCIDENTALS

In response to a recent column that bemoaned the need for Manufacturing Automation Protocol education, a glossary that explains many MAP and factory networking terms has been located. Those interested in purchasing a copy of the \$45 glossary should contact Ship Star Associates, Inc. of Newark, Del., at (302) 738-7782.

The Society of Manufacturing Engineers has announced the availability of three microcomputer software packages reportedly designed to simplify manufacturing operations and improve the productivity, efficiency and accuracy of manufacturing operations.

Manufacturing Cost Estimating is a menu-driven system that helps factory automakers estimate the costs of such machining operations as turning, drilling, milling, boring, grinding and honing. The software is available for use on the IBM Personal Computer, the Apple II, IIe, and II+ and Radio Shack TRS-80 personal computers.

Statistical Process Control performs statistical calculations for repetitive manufacturing operations. The package produces charts and graphs for most statistical calculations. These visual aids include mean, variance, standard deviation

and range information. This software works with a Sharp Electronics Corp. pocket computer and a Gage-Talker that allows the computer to receive on-line data input from gauges and calipers.

MFCalc uses an IBM Personal Computer to perform computerized calculations for mass finishing operations, including the estimation of time cycles, working capacity of mass finishing equipment and production quantities and times. The package files and recalls data, displays and prints reports and can be customized by the user to personalize reports on the screen as well as hard copy reports.

For information on the three software packages, contact Jill Bova, Marketing Services Department, Society of Manufacturing Engineers, at (313) 271-1500.

Hewlett-Packard Co. announced a directory of graphics software packages for the company's graphics plotters. Roughly 200 software packages are listed for use with both HP and non-HP computers ranging in size from personal computers to large mainframes. For additional information, mail inquiries to Inquiries Manager, Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Zook from page 17

are difficulties in getting approval to spend money to purchase the necessary hardware and software. There is also a reluctance on the part of manufacturing companies to spend the money to educate key employees," Zook explained.

"There are many people in nations around the world who are more willing than U.S. manufacturers to try new manufacturing methods," Zook added.

U.S. manufacturers are aware of factory automation improvements but are often slow to make use of them, he said.

Zook claimed education is the cure for the ills of the nation's manufacturing industry. "Education of and commitment from management

in manufacturing organizations is essential. Top managers obviously have to believe in the need to modernize their factories. And they must provide educational opportunities for their employees," the SME president asserted.

Although he cited several manufacturing industry shortcomings, Zook offered advice to manufacturing engineers interested in staying abreast of technological developments. "There is much reading to be done on the topic of manufacturing methods. Users should tour facilities that employ advanced technology," he suggested.

Zook added that users should make use of SME's educational literature and conferences to keep current with advances in the MAP

movement. "In the next few years, smaller manufacturing operations will be able to work with MAP. As this technology becomes more and more a way of life with large manu-

*"Managers
have to believe
in the need to
modernize
their
factories."*

facturers, it will also become a part of the daily life of smaller manufacturing operations," he said.

The SME president said the greatest challenge for the educational organization is keeping astride of developments in the fast-changing manufacturing industry. "We have to recognize new concepts as they arise and try to predict which ones we should emphasize," Zook claimed.

Caterpillar, the world's largest manufacturer of earth moving, construction and materials-handling machinery, is beset by the same factory automation woes that other large manufacturing companies are experiencing. Caterpillar's factories house isolated pockets of automation, Zook said.

Zook would not detail Caterpillar's plans for implementing MAP technology in its factories, except to say that the company will be utilizing MAP as one element of its "Plant with a Future" program. This project is aimed at the implementation of a variety of advanced factory technologies in its numerous production facilities. "We are trying to combine several technologies into an operation that will require far less labor, reduce the paper in the system and trim our inventory," he explained.

Caterpillar's manufacturing engineering staff is laboring to apply Just-in-Time (JIT) principles to the production of machinery parts in its factories. The JIT manufacturing method requires production facilities to maintain as little inventory as possible.

Caterpillar has also strived to combine its product design and manufacturing functions into a single system with its Cimtech project. The ability to link these often separate disciplines is a major step toward the realization of a truly computer-integrated manufacturing system.

Zook claimed Caterpillar's net designers have been spared the dilemmas of lobbying for the approval of manufacturing projects from top management.

"Our executive vice-president has been one of the prime movers in our Plant with a Future program, and he has the ear of Caterpillar's president and of its chairman of the board," he said. □

Survey from page 17

networks. The survey also solicits input from users group members about their concerns about using MAP or TOP technology. This input should help the users group determine which networking issues need to be more heavily stressed at future users group meetings. If surveyed members are candid in their replies, the data will also help the users group decide what type of education should be offered.

Like candidates for political office who solicit input from their constituents, the MAP/TOP users group is asking for sorely needed input from its members. Those factory networkers who fail to respond to the survey or take the survey lightly will foolishly squander a golden opportunity to be heard. □

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COMMUNICATIONS MANAGER

“A survey conducted by accounting and consulting firm Arthur Young & Co. found the dearth of training programs for managers is one reason for the limited impact personal computers have had in U.S. corporations. Nearly 60% of the 453 companies surveyed reported little or no use of personal computers. Only 25% of the companies reported having formal training programs for employees.

Networking Personal Computers in Organizations

Dow Jones-Irwin, publisher
Homewood, Ill.

MANAGEMENT TIPS

Hacking net costs

Users offer solid ways to snip spending.

BY MICHAEL FAHEY
Staff Writer

Innovative communications managers are taking advantage of a variety of cost-cutting measures to save big money for their companies.

William Johnson, director of telecommunications and hardware development for F.W. Woolworth Co., has employed a host of cost-saving techniques. These techniques include hiring billing consultants, reducing his reliance on leased equipment and buying inside wiring from his local-exchange carrier to reduce the retail giant's network costs.

Johnson has already recovered more than \$16,000 in telephone billing overcharges. He will save \$3,000 every month

in future telephone service charges, simply because he hired a consultant who audited the company's phone bills. “Three thousand dollars a month might not seem like much,” Johnson said. “But that's three thousand every month — forever.”

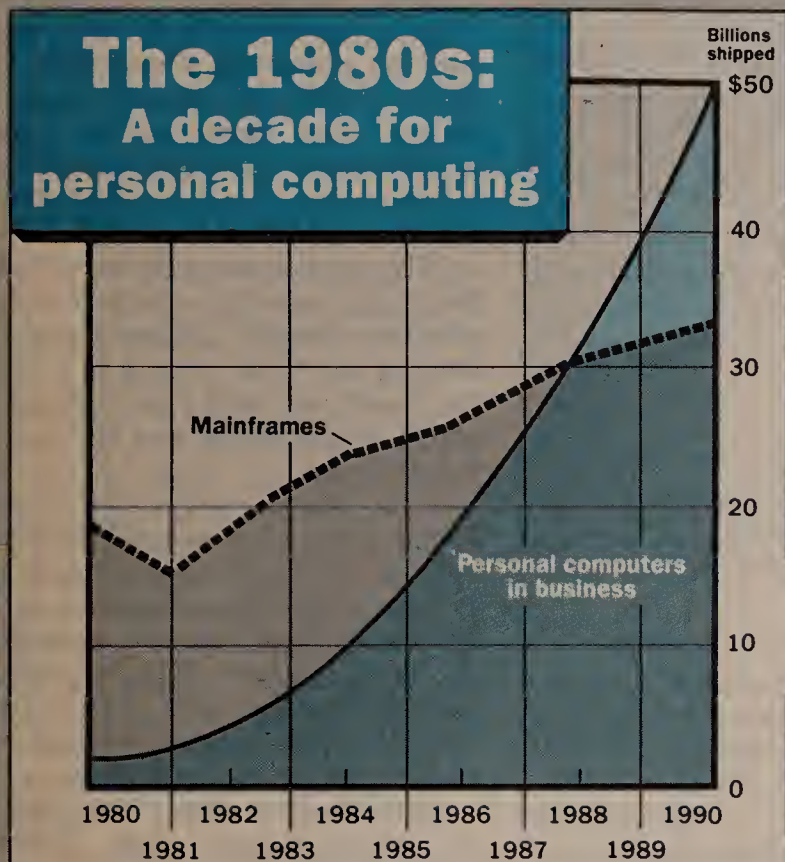
As manager of both the voice and data sides of Woolworth's communications operations, Johnson has also reduced his network expenses by buying, rather than leasing, data and voice equipment.

“We've been able to replace much of our leased equipment with new, purchased technology and still lower our costs substantially,” he said.

Johnson explained that, like many users, he leased equipment, expecting to use it for a short period of time. Instead, he

See **Woolworth** page 20

The 1980s: A decade for personal computing



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

BOOK REVIEW

Weaving PC nets

Communications managers realize the critical need for employees to share information via personal computer networking. In fact, it is estimated that by 1990, 80% of computing will be carried out directly by end users and will be personal computer-based. These projections are sending many nontechnical managers scrambling for tools to help them implement effective networking systems.

Networking Personal Computers in Organizations (Dow Jones-Irwin, Homewood, Ill.), by James Weidlein and Thomas Cross, is a terrific source of background information for managers who wish to understand the concept of personal computer networking.

The book makes extensive use of graphs and charts. It offers managers guidelines for using personal computers as networking tools, integrating personal computer networks into organizations and determining cost considerations and human factors in office automation and network design issues.

Communications managers uncertain about networking issues, such as choosing the best time to begin networking personal computers, buying the best system, understanding the attributes of an ideal network and securing information from loss or theft, will find this fundamental information written in a clear and easy-to-read style.

GUIDELINES

ERIC SCHMALL

Slashing through the network jungle

The communications analyst has evolved into a business manager, and one of his most challenging requirements is to become a competent negotiator.

Effective managers already possess significant negotiation skills. After all, the art of “getting things done through people” presupposes that one has the power to persuade workers to accomplish specific goals. Good managers constantly use these skills by trying to improve interpersonal communications and testing various management techniques. But the communications manager has another dimension in developing proper negotiating skills.

The communications manager has been thrust into the role as the corporation's chief negotiator for information transfer services. As a negotiator, the communications manager must wade through the information from competing service and equipment vendors and shifting rules of regulation and deregulation, while building a cost-effective communications network. The manager must steadily move among this chaos and translate

Schmall is network systems manager for an insurance holding company.

the corporate needs into the efficient acquisition and operation of communications services.

The corporation trusts that the communications manager has a professional appreciation of the various markets and prices. This means knowing the asking prices for various network components as well as trends in price and performance. This negotiator will also be familiar with useful equipment life statistics, resale values and rea-

the crowded marketplace and is expected to return with the best agreement to meet corporate needs.

Aside from a clear vision of the need and fundamental price the organization is willing to pay, there are a number of important components that can be used as negotiation aids.

Consider the possible links between the basic negotiable price and the following bargaining chips: maintenance factors, volume discounts, compatibility guarantees, free-trial privileges, training allowances, price guarantees and “showcase” discounts (the price break for being the first in your community to try out a vendor's product). These are just a few of the basic materials through which the manager can create some very lucrative communications advantages.

Given the frenzy of the numerous sellers out in the communications marketplace, the communications manager should not draw back in fear from the confusion. It's a buyer's market. With the proper negotiation skills, the manager should enter the fray with the sublime confidence that Mark Twain once described as “a Christian with four aces.”

“Effective
managers
already
possess
negotiation
skills.”

sonable depreciation schedules.

Finally, and most significantly, this individual helps establish the bottom-line value of sought-after equipment. Armed with this knowledge, the communications manager wades into

Woolworth from page 19

kept it longer than planned and ended up paying so much in leasing costs that it became cheaper to purchase the equipment.

However, Johnson has also put leasing to work for him by entering arrangements that offered an option to buy the product after a prescribed period of time. Johnson said there are a number of companies that allow leasing costs to be applied toward the cost of purchasing equipment.

"I wanted one system that cost \$300,000," he explained. "People said, 'We don't have \$300,000. How can we buy it?' Well, I proved beyond a shadow of a doubt that I could go to a leasing company and put it on two-year lease with an op-

tion to buy. After the two-year period, the system was paid up. It was free."

David Rappaport, partner in charge of telecommunications consulting at Arthur Andersen & Co., agreed the cost-saving benefits of buying are often overlooked. He added that the benefits of leasing, rather than renting, are also frequently ignored.

"The question is understanding your needs and looking at the economics," Rappaport said. "If you are going to keep equipment around for a couple of years, you may want to put it on a two-year lease rather than rent it. Or you may want to buy it outright."

"The worst thing you can do is put something on month-to-month

rental and then turn around a year later and realize that you spent 20% more than you needed to," he added.

Another area where purchasing can yield considerable savings for network users willing to make an initial capital investment is inside wiring, according to Woolworth's Johnson.

"Buying your own wire pays back in spades," Johnson said. "Our payback period at our New York facility was eight months. The whole package cost us \$180,000. It seemed like a whole lot of money, until you consider the eight-month payback period."

Johnson also relies on other cost-cutting techniques. For example, he said, packet switching has provid-

ed Woolworth with an economical alternative to sending data over point-to-point dial-up lines.

"Packet switching is an untapped resource for low-speed traffic," he said. "There are a lot of public data network providers out there who have very sophisticated capabilities and very attractive costs for packet switching."

Johnson also saved money by reducing the company's reliance on telex, courier service and overnight mail by installing high-speed facsimile machines. "That's an interesting thing that people should take a look at, because I know that it has saved me thousands of dollars per month."

"I've even gone so far as to buy a [facsimile] machine for our public relations people," Johnson said. "It worked out that I could buy them the machine, send our correspondence by [facsimile] and still save a lot of money."

John Coker, senior vice-president and manager of product development at Boston Safe Deposit and Trust Co., said new modem technology has allowed him to turn to dial-up lines rather than expensive leased lines and offer the company's financial management services to a larger base of customers.

According to Coker, his company, which manages large pension funds, has been able to attract customers who are unable or unwilling to use leased lines to access Boston Safe's on-line data base and financial services. "A leased line from here [Boston] to California can run as high as \$3,000 a month," he said. "But your daily cost for dial-up lines may be only \$5 to \$10."

Furthermore, Coker added, there is generally a 90-day wait for installation of leased lines. Using the new modems and dial-up lines, Coker is able to put his customers on line in 30 days or less. □

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NETWORK WORLD

The Weekly for Leading Users of
Communications Products & Services.

PEOPLE

Willis H. Ware, a senior research staff member at The Rand Corp., received the 1986 Distinguished Service Award of the American Federation of Information Processing Societies at the National Computer Conference in Las Vegas.

The award recognizes individuals making contributions in the information-processing field.

Rolf E. Soderstrom has been named executive vice-president of Codex Corp. Most recently, he was senior vice-president and general manager of product operations.

James Koehn was appointed vice-president and general manager of Harris Corp.'s broadcast division. He succeeds **Gene T. Whicker**, who is retiring, but will continue to serve as a consultant to Harris.

Charles R. Abbruscato was promoted to director of multiplexer engineering at the Ft. Lauderdale, Fla.-based Racal-Milgo, Inc.

He previously served as manager of T-1 multiplexer and security products.

PRODUCTS & SERVICES

Modem, software, circuit board out

2,400 bit/sec half-board modem

OmniTel, Inc. has introduced a 2,400 bit/sec half-board, asynchronous modem for IBM's Personal Computer line.

The **Encore 2400 HB** is compatible with Hayes Microcomputer Products, Inc.'s command set and requires only a half-size Personal Computer expansion slot, leaving the full-size slots free for other enhancements.

The modem is designed to operate on the switched telephone network in full- or half- duplex mode at speeds of 300, 1,200 and 2,400 bit/sec.

The Encore 2400 HB is compatible with industry transmission standards, such as the CCITT V.22bis standards and Bell Laboratories' 212A and 103 standards.

The modem features communications software that supports file transfers, script language and terminal emulation. The modem also offers automatic speed selection and fallback, call progress reporting and software-controlled speaker volume.

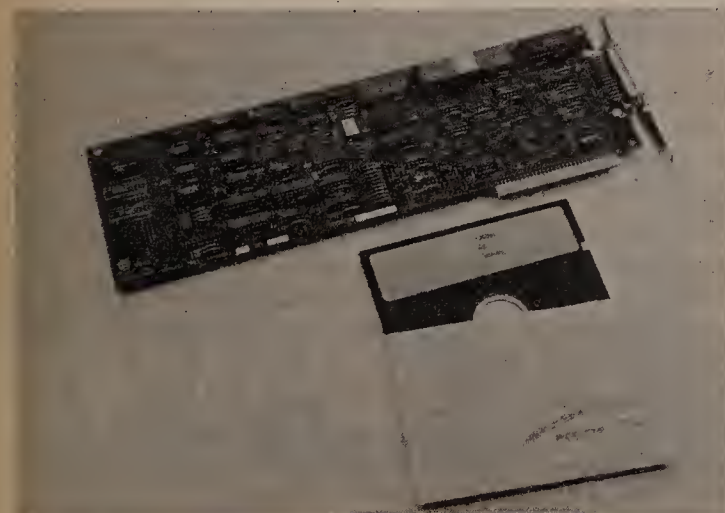
The modem is priced at \$399.

OmniTel, Inc., 5415 Randall Place, Fremont, Calif. 94538 (415) 490-2202.

X.25 circuit board and software

Western Digital Corp. has introduced a circuit board that enables personal computer users to work with synchronous services supplied on GTE Communications Corp.'s dial-up, packet-switching network.

Dialcard25 allows personal computer users to communicate synchronously over the Telenet public data network. Dialcard25 operates at speeds of 1,200, 2,400 and 4.8K



Western Digital Corp. Dialcard25

bit/sec.

The board offers three virtual circuits, transparent to the network, enabling users to talk to three separate computers at one time. The product provides automatic retransmission of detected errors as well as the capability to perform multiple tasks simultaneously. Western Digital claims X.25 Dial Service reduces the cost of connection access time to the Telenet network by about one-quarter.

The software for Dialcard25 uses the same command format as



OmniTel, Inc. Encore 2400 HB

Telenet's asynchronous packet assembly/disassembly software. Western Digital will offer Dialcard25 with Telenet software on a floppy disk.

Dialcard25 will retail for \$595

Western Digital Corp., 2445 McCabe Way, Irvine, Calif. 92714 (714) 595-1139.

Protocol analyzer software

Frontier Software Development, Inc. introduced a software package that adds automated, unattended control and programming capability to a remote or local Hewlett-Packard Co. protocol analyzer.

The **Automated Protocol Analyzer Control (Apac)** package runs on a host computer, such as a personal computer, and acts as a master station for one or more protocol analyzers.

The Apac allows several tests to be linked without user intervention and to be performed conditionally, based on the results of the previous test. The software also performs network management and control functions. The Apac runs on HP's HP150 and the IBM Personal Computer line.

It costs \$1,995.

Frontier Software Development, Inc., 14 Livery Road, Chelmsford, Mass. 01824 (617) 256-4738.

Line-sharing for dialback modems

A new **Anderson Jacobson, Inc.** point-to-point bridge enables central site leased-line modems equipped with automatic dial backup capabilities to share switched network telephone lines for unattended dial backup operation.

With the **AJ 8601-PB**, up to eight dial backup modems can share one or two pairs of switched network lines. Central site costs are reduced, because fewer lines are re-

quired to support dial backup operation. The bridge supports any AJ point-to-point modem that operates in full-duplex mode over four-wire leased lines with two-call dial backup capability. The product accommodates tone and pulse dialing.

The single unit list price for the chassis with one bridge module is \$1,095.

Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, Calif. 95131 (408) 435-8520, Ext. 440.

DEC videotext software enhanced

Digital Equipment Corp. has enhanced its videotext application development system.

VAX Valu (VTX Applications Link Utilities) Version 2.0 runs on DEC's VAX line of systems from the MicroVAX II to the VAX 8800.

The enhanced software includes four new features. A new component, Remote Update Server Link, enables a programmer to design applications supporting real-time manipulation of pages and keywords in a VAX VTX information base.

With External Link, system level programmers can create videotext applications that transparently act as information bases on any computer running on a DECnet network.

The VTX Application Service (VAS) allows applications programmers to write transaction applications and connect VAX VTX to applications running on a DEC system or another vendor's system using X.25 or IBM Systems Network Architecture networks.

Terminal Control Program/Terminal Specific Modules enable programmers to make VAX VTX applications accessible for any terminal.

VAX Valu is priced at \$8,160 for the MicroVAX II; \$21,200 for the VAX 8200 and 8300; \$27,200 for the VAX 8500 and 8600; and \$40,800 for the VAX 8800. Version 2.0 will be available in September.

Digital Equipment Corp., 146 Main St., Maynard, Mass. 01754-2571 (617) 897-5111.

Advancenet from page 21

of factory floor computers.

The company said its Arpa Services/300 and Arpa Services/800 are supported on Ethernet or IEEE 802.3 local-area networks. The software adds Arpa-defined simple mail transfer, file transfer and teletype network protocols, the BSD-defined remote-copy file transfer, remote logon, remote command execution and Berkeley interprocess communication utilities to HP 9000 Series 300 and Series 800 systems. With proper gateways, the Arpa Services/300 package also supports communications between networked Series 300 workstations and workstations on Arpanet and the Defense Data Network.

The Arpa Services/300 packaged with HP's NS will support communications between HP 9000 Series 300 workstations and other HP systems for \$995.

Emulation packages

The company also released emulation packages supporting RJE for text and binary files to IBM mainframes from HP 9000 Series 200, Series 300 and Series 500 technical workstations.

The interface and software needed for the Series 200 and Series 300 workstations costs \$2,750, while the interface and software for the Series 500 is priced at \$4,615.

The \$2,950 HP Thinlan hub repeater supports connection of up to four 610-foot long Thinlan cable segments.

It also allows the Thinlan cable to connect with thicker cable segments. □

Bridge from page 21

Mountain View, Calif., company's business.

The CS/1-TR is essentially identical to Bridge Communications' Ethernet communications server, but uses Texas Instruments, Inc.'s token-ring chip set in lieu of the Ethernet chip set, Carrico said. Bridge Communications will be offering this chip set — configured as a controller board — as a subsystem to computer vendors.

Devices attach directly to the CS/1-TR, which in turn is connected to the network.

Up to four I/O cards, each supporting up to 16 ports, can be added to each communications server. The cards support seven different types of ports, such as RS-232, 3270-compatible coaxial Type A ports, bisynchronous and bit-synchronous RS-232 ports. The server operates with IBM's Type 1 and Type 9 cables and can coexist on the same network — but not communicate directly — with devices connected through IBM's network adapter card or multistation access unit.

The server and IBM Token-Ring Network-connected devices cannot communicate because the Bridge Communications server software, a version of the Xerox Corp. Network System, uses different, higher level protocols than the Token-Ring Network software.

The CS/1-TR is priced at \$16,000 for a 64-port version. □

Opinions

MODERN MANAGEMENT

ALAN SCHAEVITZ

The demise of private nets?

Many years ago, during a skit on the *Sid Caesar Comedy Hour*, Caesar stood on stage looking upward, waving his hands, saying, "No, no! You can't land here."

Another gentleman walked by, looked up and asked, "What was it?" "We'll never know," Caesar answered.

The telecommunications industry is undergoing massive trauma due to deregulation, divestiture and technological innovation. Sometimes the telecommunications professional is a lot like Caesar's character — afraid to look too closely at this unknown entity for fear of what might be coming down. Managers find change acceptable only when it doesn't alter the fundamental environment. Otherwise, they often resist it until it's unavoidable.

In the early part of this century, many hailed the automobile, not for the incredible impact it would have on our perception of time and distance, but for the positive impact it would have on the environment. The automobile was going to clean the streets of the mess that horses left behind.

This kind of shortsighted view is evident today in the field of telecommunications. Articles and speeches bemoan the impact of change on the current telecommunications environment in terms

hardware components. As a result, the network manager's staff could require the network development staff's full complement of software skills. When will companies realize that maintaining two separate groups with essentially the same skills is inefficient?

If capabilities such as the much-touted software-defined network become commonplace, network managers will surely use them to reconfigure their networks dynamically to improve performance and reliability. If they do, managers are simultaneously fulfilling both the network management and network design functions.

A boom in shared nets

Changes in network economics and technology have made the concept of utility networks, or shared networks, the latest rage. Many corporations are consolidating their individual networks into one shared utility, and many common carriers are building such networks as public offerings.

The potential advantages of shared networks, public or private, are well-documented. However, as more and more of a corporation's telecommunications migrates to a shared network, a larger proportion of network development will involve changes to the existing network, which is carrying live traffic. The network manager must exert rigid control over changes in this live environment in order to minimize the negative impact on existing users. This becomes even more critical and difficult in a shared network, where change for the benefit of one customer population can adversely affect an unrelated customer population.

In many companies, network development, a separate organization from the network management and network operations departments, is responsible for instigating changes to the existing network that are required by new applications or by a change in the number of users.

This often puts the network manager between the rock of increased demands and the hard place of network stability. While this dilemma has yet to be See **Network manager** page 36

of network costs, design and management. While these issues are certainly important, the communications industry seems studiously to avoid dealing with what these changes might mean to the fundamental nature of its segments.

It is increasingly clear that a network's software components are dominating the more traditional

Schaevitz is director of the San Francisco office of Network Strategies, Inc.

CORPORATE MERGERS

IAN ANGUS

Wang's PBX bargain

In recent weeks, Wang Laboratories, Inc. has made two moves that could have a major impact on the private branch exchange market.

In mid-April, Wang announced the Wang Branch Exchange (WBX) and the Wang Integrated Office Solution (Wios), based on the Telenova, Inc. Telenova 1 PBX and Wang's VS minicomputer. In mid-May, Wang purchased all remaining shares of Intecom, Inc. and announced its intention to integrate the PBX manufacturer as a Wang subsidiary.

Some industry observers de-

fice System, which ties the WBX to a Wang VS minicomputer to produce a voice and data office automation system. This is the first Wang system to use twisted-pair rather than coaxial cable for communications. It offers a level of integration comparable to Northern Telecom, Inc.'s DV-1 system, with the addition of voice messaging.

It seems likely that the DV-1 will be Wios' primary competition until IBM, Rolm Corp. and AT&T enter the market for high-end integrated systems that have fewer than 100 lines.

Northern Telecom has the advantage of early entry, with some 600 to 700 systems installed. These systems, however, are small — fewer than 15 stations in most cases — and many are in Northern Telecom's own offices.

Northern Telecom still has major work to do in order to deliver on all of the DV-1's promises. And the shortage of good office system software that runs under Unix is creating major marketing problems.

Wios, on the other hand, is based on two products that already exist. It also uses existing Wang software for word processing, calendaring and electronic mail, and it supports the thousands of applications packages and development tools that are already available for Wang systems. These factors, plus Wang's credibility as an office system and, to some degree, a data processing supplier, give its new product a formidable advantage.

Wang is introducing Wios very cautiously. The initial rollout is in 10 cities: Newport Beach, Calif.; Boston; New York; Chicago; Century City, Calif.; San Francisco; Dallas; Atlanta; Washington, D.C.; and Cleveland. In each of these cities, a Telenova account executive is assisting Wang in providing the PBX expertise the computer vendor lacks.

Wang bought 40% of Telenova last August, and already a joint product is on the market. In contrast, Wang has owned 20% of Intecom since 1984, and the sole result to date has been the Keystone voice/data workstation, a unit displayed at trade shows but nowhere else, and the promise of a link between Intecom's IBX and Wang's DVX voice-messaging system.

Like IBM, Wang found that owning a minority share of a major PBX manufacturer can produce a lot of headaches, but not many results.

See **Wang** page 37

Angus is president of the Angus Telemanagement Group, Inc. in Toronto.

"Some industry observers call Wang's moves inappropriate. They're missing the point."

scribe these moves as confusing or inappropriate. They're missing the point. Wang's move into PBXs has strategic implications that competitors and customers cannot afford to ignore.

The WBX, a Wang-label version of the Telenova 1, is a nonblocking voice and data system that supports between 30 and 80 users, each with full voice communications capability and data communications at an asynchronous rate of up to 19.2K bit/sec asynchronous. In addition, the system boasts one of the most ergonomic electronic telephone sets available, the Wang Station Set. The introduction of the

WBX marks Wang's entry into the small business telephone system market — an important development in itself.

But the announcement had even more impact as a result of the simultaneous announcement of the Wang Integrated Of-

Air your views

If a burning communications industry issue has you up in arms, write a guest column about it for *Network World*. Manuscripts must be letter quality, double-spaced and about 1,000 words in length. Disk and modem submissions are encouraged. Columns should be timely, controversial, literate and technically accurate. Contact Steve Moore, features editor, at *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701 or at (617) 879-0700 ext. 584.

DIAL-UP LINKS

LYNNE M. DAVIS

High-speed modems are the key

More data communications users today are migrating to higher speeds for dial-up communications. International Data Corp., a Framingham, Mass.-based research firm that studies the information-processing industry, estimates that the 1985 dial-up modem market totaled 700,000 units. Within this market, the relatively new 2,400 bit/sec (V.22 bis) dial-up modem segment grew an unprecedented 604% from approximately 24,140 units in 1984 to 169,580 units in 1985, while the 1,200 bit/sec (V.22 and Bell 212 standard) dial-up modem segment experienced a relatively flat growth rate, from about 459,000 to 431,000 units.

User migration to higher speed dial-up modems is expected to continue, though at a slower rate. Major factors influencing this growth are user awareness of the benefits of dial-up networks, increased interest in personal computer communications and the entrance of improved high-speed dial-up modem technology.

Depending on the application, the benefits

Davis is a senior research analyst at International Data Corp. in Framingham, Mass.

of a dial-up network can be great. One benefit is lower transmission costs. Leased lines have a fixed cost since users are charged regardless of whether the line is being used to transmit data. Because charges on a dial-up network are assessed only for the amount of time the line is in use, users who send data for less than two hours per day usually save on the cost of an alternative leased line.

Other benefits of the dial-up network include immediate and universal network service. Since the public switched network is widely installed and is serviced by the public telephone company, users can get dial-up service within a few days. In contrast, for dedicated leased-line service, users sometimes wait up to three months for installation.

The dial-up public network has been used primarily for low-speed (1,200 bit/sec and slower) asynchronous data transfers. Terminal and personal computer users have shown interest in accessing multiple corporate and public mainframe data bases and services. Applications supported usually include electronic mail, small file transfers and information retrieval from services such as Compuserve and

Dow Jones News/Retrieval Service. Use is expected to increase throughout the next five years as services become cheaper and more applications become available.

Dial-up data communications users generally discover two major problems when accessing international corporate and public data networks. One problem is the noise and distortion associated with transmitting data over unconditioned phone lines. The other is modem incompatibility. New advances and standardized modem technology have helped to diminish some of these problems for users.

To combat poor telephone lines and ensure error-free transmission, vendors are producing modems with built-in error-correction schemes and fallback procedures. Error-correction schemes help to detect, correct and retransmit problem data. In 2,400 bit/sec modems, popular asynchronous error-correcting protocols used are MNP and X.PC, both of which have been licensed for use by vendors of modems and communications software.

The high-speed asynchronous modem by Teletbit Corp., which is claimed to support data

See **Dial-up modems** page 37

► TELETOONS — By Phil Frank



Tell me, Madame Zuma.. how long have you been a telecommunications consultant?

MULTIVENDOR CONNECTIVITY

MARK WINTER

More, more, more . . . Integrated systems continue to proliferate

In 1985, more than 17,000 integrated office systems were installed for about 900,000 users, according to Link Resources Corp., a New York-based market research firm. These include IBM's Disoss and Profs, Wang Laboratories, Inc.'s Wang Office, Data General Corp.'s Comprehensive Electronic Office, Digital Equipment Corp.'s All-In-1 and Hewlett-Packard Co.'s Personal Productivity Center.

In addition, more than 600,000 employees in some 2,000 organizations are users of public electronic mail services. These services include Western Union's Easylink, MCI Digital Information Services Corp.'s MCI Mail, General Electric Information Services Co.'s (Geisco) Quik-Comm, British Telecommunications plc's Dialcom and others.

Protocol converters are the most basic hardware solution for systems integration, but the low-end black box converter is a thing of the past. On one hand, the proliferation of personal computers and terminals makes the add-on board, such as the Norcross, Ga.-based

Digital Communications Associates' Irma board for 3270 emulations, a cost-effective solution.

On the other hand, network server technology, such as that offered by three-year-old Banyan Systems, Inc. of Westboro, Mass., is gaining acceptance.

Software bridges have been introduced by minicomputer manufacturers over the past year. Last summer and fall, IBM's Disoss was blessed by Digital Equipment Corp.'s External Document Exchange facility, by Data General linking its Comprehensive Electronic Office to Disoss and by Honeywell's Docu-Link interfacing its DPS minicomputers with Disoss. Hewlett-Packard, Prime Computer, Inc. and others are also working on Disoss links for their office automation products.

In addition to the computer manufacturers' bridge software, third-party software companies offer a variety of IBM-compatible communications software to both end users and OEMs.

These include Soft-Switch, Inc. of King of Prussia, Pa., which provides a family of products integrating public and local mail systems; See **Integration** page 36

Winter is director of New Communications Services at Link Resources Corp. in New York.

Features

June 23, 1986

Artful integration

Integrating voice and data? That's a cinch compared to merging computer graphics and video. After years of technical struggle, the communications staff at Mary Kay Cosmetics, Inc. has devised a way for the company's executives to augment their video teleconferences with computer graphics.

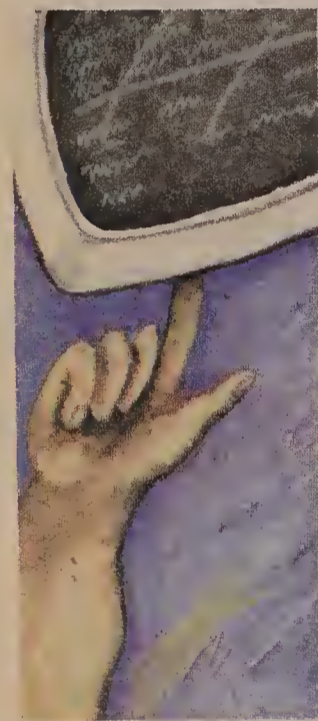
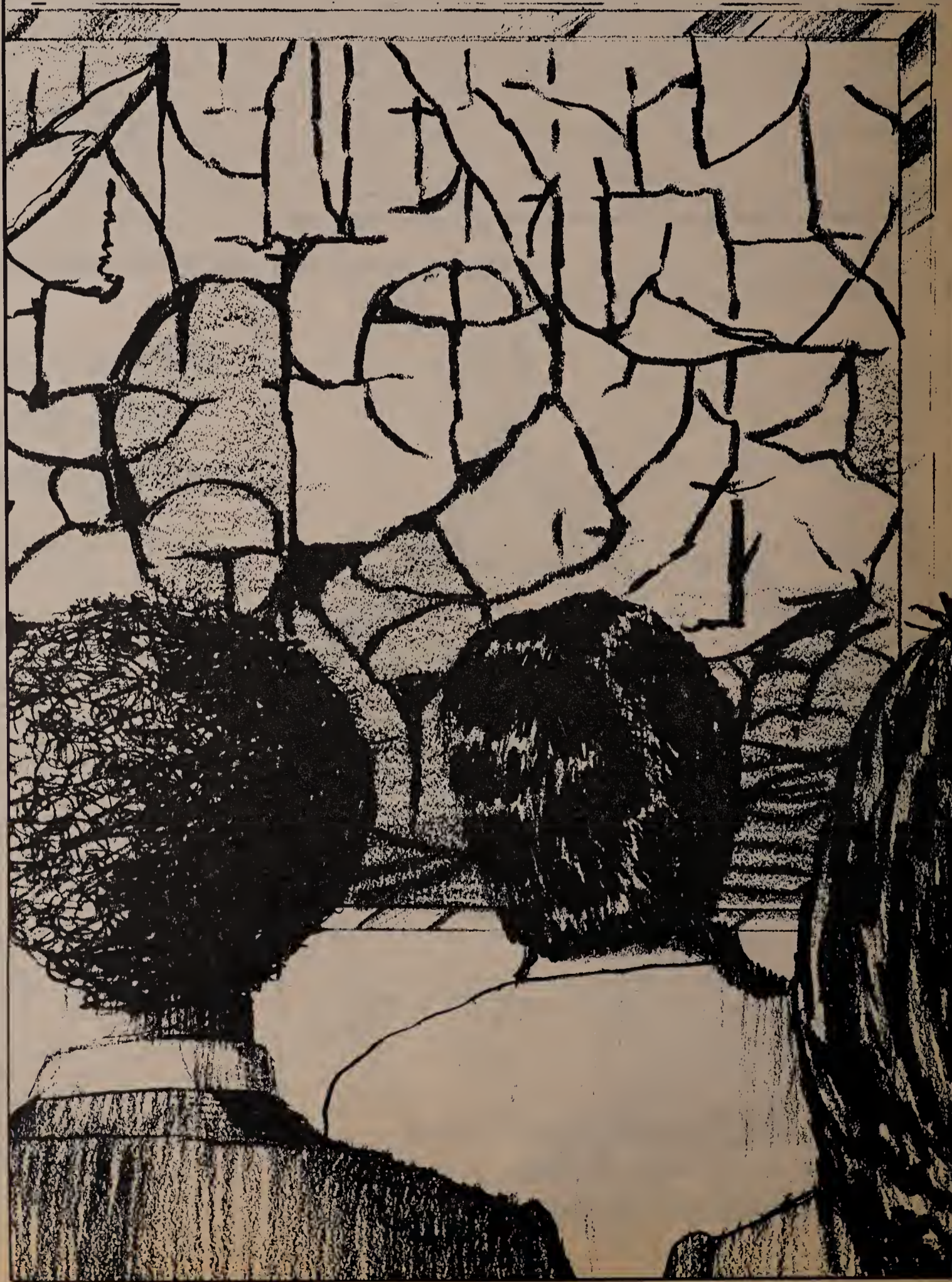
Page one.



FEATURE FOCUS

Artful Integration

At Mary Kay Cosmetics, a hot new look in communications blends computer graphics into video.



Pumping up local nets

New features on local-area nets are anything but lightweight. A new, multitasking version of MS-DOS, specialized value-added servers and other add-on modules are just a few examples. While these changes will put a strain on existing applications software, they will make future local nets more efficient.

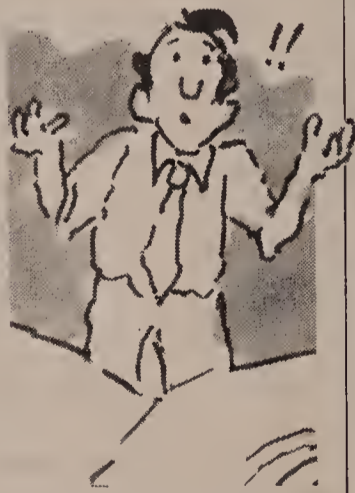
Page 31.

What you don't know can hurt you

Part two of a two-part series.

Portable applications software is widely used and easily abused. Companies and contractors alike should know their rights before they sign on the dotted line. A carefully planned agreement is the best way to avoid ending up in court.

Page 35.



Continued from page 1

topics from research and development to computer systems management to quality assurance.

The company estimates that the meeting costs only \$3,500 in salaries for the managers who are participating, but saves tens of thousands

Rothfeder is a freelance writer based in Wyckoff, N.J.

of dollars that would otherwise be wasted daily on redundant, nonproductive ad-hoc caucuses and on routing paper reports and memos among dozens of departments.

Another reason for the Communication Center's longevity is that it has grown into an increasingly sophisticated and useful channel of information as more and more high-tech equipment for meetings and presenta-

tions has been perfected.

Previously, managers described the virtues and plans of their corners of the corporation with the help of chalkboards.

Now, they hold a full-fledged interactive video teleconference in two meeting rooms 500 feet apart, each with dual seven-foot screens.

One screen projects the video image of the person speaking, while the other displays carefully

designed backup graphics created on a computer terminal.

Transmissions between the two rooms travel over a video cable link.

The setup includes full ¾-inch tape standard Sony production facilities, and costs between \$150,000 and \$200,000.

Although the center may be an aspirin that relieves Mary Kay's corporate communications overhead pains, it is a splitting headache to produce.

In fact, a communications hurdle that few other firms are willing to confront could have shut it down just four years ago.

However, Mary Kay's communications staff persevered and was able to merge and then cablecast two wildly disparate high-tech applications: video and computer graphics.


Graphics vs. video

The core problem in merging graphics with video lies in differing resolution standards.

In the U.S., video is locked into the aging, relatively low-resolution 525-line North Texas standard color format, while computer graphics conform to the far superior red, green, blue format of 1,100 lines or more.

What this means is that for a computer graphic to be projected onto a video screen, some of its high-end characteristics must be neutralized and its resolution must be halved.

"Marrying video to computer graphics is a shotgun wedding; the two are so completely incompatible," says Bruce Reynolds, a video consultant for Sony Corp. in Hollywood, Calif. "This

 Continued on page 30



BRUCE GILFOY

From page 29

stems from the fact that the people designing video equipment and those designing computer graphics equipment are two separate groups that hardly ever share knowledge with each other. In fact, they don't want to facilitate interplay between the two technologies. So it's left up to the end user to figure out how to integrate computer graphics and video."

Linda Lucas, supervisor of staff development at Mary Kay and the producer of the Communication Center, knows all too well what Reynolds is talking about. She led the effort at Mary Kay in 1982 to upgrade the Communication Center when the firm decided to move beyond the staid lecture format for management presentations and turn the meeting into an exciting multimedia show. "We wanted a two-room interactive setup with computer graphics providing visual support for the speakers' presentations," Lucas says.

"Only video allowed this sort of simultaneous output of information to different sites. Using com-

puter graphics [in conjunction with video] was a particularly bold stroke, but an excellent one as it turned out. We've found that solely hearing information does not have nearly the impact of hearing it and seeing it projected on a screen at the same time. With computer graphics to back up a speaker, audience retention and understanding is enhanced to about 60%, from less than 40% without computer graphics."

Creating the graphics on the computer for the meeting each week is an elaborate chore, yet it is the easiest part of the behind-the-scenes effort supporting the Communication Center.

Each manager scheduled to speak at an upcoming session inputs a project update on one of 300 terminals scattered throughout Mary Kay's facilities and then submits it to a central file residing on the firm's Digital Equipment Corp. VAX 11/780 computer.

A series of Basic and Fortran programs then search through these project updates and pull out the significant data or impact state-

ments included in them.

These impact statements are edited, highlighted and then rejiggered into a bar, line or pie chart by Disspla, a graphics program from Integrated Software Systems Corp. of San Diego.

With the computer graphic stored in the CPU, the work of preparing it for video presentation begins. The original intent was to take the image stored in the VAX 11/780 and send it directly into the video cameras during the meetings.

But this approach was scrapped when it became apparent that the greater the number of images being produced and the more complicated they were, the slower the computer system operated. Thus, the VAX could not be relied upon as an efficient and timely output link to ship images into the video unit.

Instead, the medium chosen to hold the computer image was a high-resolution slide. Before the session, a slide of each graphic is produced using the Lasergraphics slide system from Lasergraphics, Inc. in Irvine, Calif. These slides are then projected one at a time onto a screen and simultaneously shot by a video camera that sends output via the system to a video projector, from which they are transmitted to the remote meeting rooms as needed.

But with this choice made, the greatest challenge to conducting the upgraded Mary Kay meetings still remained. How could the computer image be honed so that it adequately fit video's limitations? Solving this one question took up nearly all of 1982 and 1983 as Lucas, her staff of four and a team of consultants lived through a daily tug-of-war with the quality problem that arises when converting red, green, blue graphics to North Texas standard color video.

Just sending a typical untouched red, green, blue image through a video output device produces a graphic that is too complicated to read quickly. The resultant graphic also bleeds, becomes incomprehensible at many points of the video screen and has its originally sharp colors stretched to such a degree that they ruin the integrity of the graphic rather than enhance it.

One solution to the computer graphics and video standoff would be a rapprochement between the two industries.

However, says Sony's Reynolds,

"How could the computer image be honed so that it adequately fit video's limitations? Finding the answer to this one question took up nearly all of 1982 and 1983 as Lucas, her staff of four and a team of consultants lived through a daily tug-of-war with the quality problem."

"There is no serious move afoot to raise video standards to the computer's level — and there won't be at least until digital video becomes an economical reality sometime in the next five years. So it's up to the end user to understand what makes good video graphics."

"For one thing," Reynolds observes, "video graphics have to be very simple. When a graphic is designed for a computer, an awful lot of information can be on a screen because it's probably going to be read by a single user at his own speed. But when you transfer it to video, the audience only has a certain amount of time to understand it, and then the picture's gone. It doesn't have time to take in a lot of information. That's the major difference."

"We'd like to see the video people up their standards to meet ours, but we don't expect it," adds Dan Manardi, an independent computer graphics designer in Westminster, Colo. "Hopefully, a call to standardize will come from those users in the corporations who are attempting to incorporate the two technologies."

Linda Lucas, unable to fall back on standardization, had no choice but to develop a series of guidelines (see list on page 37) for modifying computer graphics before projecting them in a video format. Using those guidelines, Lucas now produces 300 to 500 slides each month for the Communication Center. "The most important rule to remember," she says, "is the old video adage, Kiss — that is, keep it simple, stupid."

Fear of mixing two previously separate mediums is clearly scaring off many other communications managers from undertaking similar projects.

Some manufacturers of microcomputer products are selling relatively inexpensive synchronous generator locks, or gen locks, that they claim turn a computer's graphic output into a video picture for direct transfer to a video system. Some users are purchasing this equipment, believing that they can avoid the trouble of living up to the Lucas guidelines.

However, says Bob Peterson, a video consultant based in Santa Cruz, Calif., "The image coming out of the [IBM] PC or any other micro is made using computer software that is prepared for output to a

Continued on page 37

► VIDEO AND CAD/CAM

A failure to communicate

While the communications staff at Mary Kay Cosmetics, Inc. has developed an effective set of rules for preparing standard computer graphics for video projection, those rules don't address what a user can do with a high-resolution computer-aided design/computer-aided manufacturing (CAD/CAM) graphic.

tively pressing to bring video standards up to those of computer graphics, but rather are examining ways to standardize CAD/CAM equipment.

The result, they hope, will be a world where a file transfer between any two CAD/CAM computers can be accomplished, and not just between those machines bearing the same name tag. At this point, the Transfer Control Protocol/Internet Protocol (TCP/IP) communications architecture seems to be the choice of CAD/CAM equipment makers.

Most leading manufacturers, including General Electric Calma Co. of Santa Clara, Calif., and ComputerVision Corp. of Bedford, Mass., are evolving their product lines to conform with TCP/IP ground rules. As for the inability to project CAD/CAM onto the video medium, CAD/CAM manufacturers say that they receive very infrequent requests to network the two.

"We're not addressing the CAD/CAM-to-video issue," says Chuck Thompson, a marketing director at GE Calma. "Only one of our customers, a multinational firm, has asked for the capability of having a CAD/CAM model in West Germany that could appear on a video screen in Pennsylvania in full-resolution. It has a broad network, and they're looking to fit CAD/CAM into it."

"But from our point of view, there's no way to do what that," he adds. "So they've backed away from their request, because it's too complex at this point."

— Jeffrey Rothfeder

"A CAD/CAM engineering drawing can't be simplified before it is transmitted."

A CAD/CAM engineering drawing can't be simplified before it is transmitted to another system without distorting its details, which in this case are the heart of the image.

Like IBM and Apple Computer, Inc. computers, CAD/CAM and video are completely incompatible. The only way to move a CAD/CAM image from one site to another is to transfer it as a data file via phone lines, satellite or microwave. But such a transfer can only occur between computers that speak the same CAD/CAM language. Saddled with this limitation, CAD/CAM manufacturers say that they're not ac-

► LOCAL NETWORKING

Pumping up local nets



BARBARA JOHANSEN NEWMAN

New operating systems and servers add muscle to local-area nets.

BY JAMIE LEWIS

Special to Network World

If Arnold Schwarzenegger were a communications manager, you can bet he wouldn't base his network on static technology. He'd make sure it had both the muscle to handle current needs and the backbone to support long-term growth with as little obsolescence of existing equipment as possible.

One communications technology that promises such flexibility is the microcomputer-based local-area network.

The current evolution in local net technology is bringing to the market new components that can be added to existing local networks. Communications and data processing managers should monitor the directions that local-area network technology is taking and the ways it will affect corporate installations and bottom-line economics.

Breaking the RAM barrier

We've all heard about the yet unreleased Version 5.0 of MS-DOS, which will run in protected mode on the IBM Personal Computer AT and compatibles. This will allow DOS and application programs to break the 640K-byte barrier and use up to 16 megabytes of random-access memory (RAM).


Speculation about how this new DOS will look is just that — speculation. However, some conclusions about how the new DOS will affect local nets can be drawn from information that Microsoft Corp. and IBM have leaked to the press and software developers.

First, and most important, the current library of more than 40,000 single- and multiuser programs that run under MS-DOS on the IBM Personal Computer cannot run in protected mode on an IBM Personal Computer AT, and MS-DOS 5.0 will not change that. Developing new applications will take at least 18 months, so MS-DOS 5.0's new features will not be available in applications until quite some time after its release next year.

The multiuser standards for local-area net applications set by DOS 3.1 will be maintained under DOS 5.0, which simply adds the functionality of protected mode operation to these applications.

The new DOS will also have an impact on network operating systems. Because the three major network operating systems available — the IBM Personal Computer Network Program, Novell, Inc.'s Advanced Netware and 3Com Corp.'s 3Plus — are based on different architectures, the paths the vendors take to adopt MS-DOS 5.0 will be different.

The IBM Personal Computer Network Program — and any system based on Microsoft Corp. networks — uses DOS as an integral part of network file service. The file server soft

 Continued on page 34

Lewis is a corporate communications writer for Novell, Inc. in Orem, Utah.

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Digital Service

From page 31

ware in these operating systems runs as a DOS application in the network server. MS-DOS is currently a single user, single tasking and single threaded operating system, which is a system on which one operation has to run from start to finish before another can begin — considerably slowing down disk access time. This kind of system also slows down the networks running under it. In addition, DOS currently limits the network server operating system to 640K of RAM. This puts a ceiling on performance by reducing the amount of cache memory at the server and the number of files that can be opened simultaneously on the network. The additional memory available under MS-DOS 5.0 increases both the number of users and cache memory a server can support.

In its current state, DOS must finish one task before starting another. This poses no major problems in a stand-alone environment, but when multiple users request data from a DOS-based file server, performance slows. Performance will increase as a result of MS-DOS 5.0's multitasking functions.

But since the file server in the Personal Computer Network Program runs as an application of the current version of DOS, it will have to be modified to take advantage of DOS 5.0's features. Because of the development time involved in this process, it will be at least a year before a new version based on Micro-soft networks appears.

In 3Com's 3Plus, the network operating system's file server software runs as an application of a DOS emulation program called Concurrent Input/Output System (Ciosys). This program lets the 3Com system avoid DOS for disk access and has features that are designed to support a multiuser environment. The most significant of these features is a multithreading operation that improves the net-

With all three network operating systems, when multiuser local-area net applications for DOS 5.0 arrive, they will provide the same extended functionality as single-user applications. This includes multitasking and protected mode operation

*“Local nets
will soon be
designed to
handle
centralized
processing.”*

—benefits that will significantly boost the power of a network workstation.

Communications functions

While the application-to-network interface for most applications has been standardized under DOS, network communications standards are still in transition. Users can expect to see an evolution of standards in this area.

The current standard in this area is IBM's Network Basic I/O System (Netbios), but it has to grow to meet the needs of users. First released as firmware on the IBM Personal Computer Network adapter, Netbios is a peer-to-peer communications protocol that facilitates communication between machines on the network. Any application needing to talk directly to the network hardware — such as an SNA gateway to an IBM mainframe — uses the Netbios interface for communications functions.

In its current state, Netbios cannot adequately perform inter-network communications between dissimilar systems. IBM's introduction of LU 6.2, which provides peer-to-peer communications across dissimilar systems, seems to be merging with Netbios. Netbios and LU 6.2 will coexist on local nets, overlapping to provide inter-network communications in office environments.

But before the benefits of these application interfaces can be realized, applications that use them have to be developed, tested and marketed.

This process has already begun, albeit slowly, and users can expect to see local-area network communications built around these interfaces within 18 months. These applications will let network users communicate transparently with minicomputers, mainframes and other hosts as if the hosts were actually on the local net.

The value-added server

In multiuser systems, both file management and applications processing are centralized in one machine that is accessed by dumb terminals. Centralizing both of these processes hampers overall system performance, which is why many

users have moved to distributed processing on local-area networks.

On a local net, only file management processes are centralized; all application processing is performed by personal computer workstations. This improves performance and is a major benefit of local networks over multiuser systems.

Although local nets have ushered in the age of distributed processing by using intelligent workstations, some applications, such as data base management, can benefit from centralized processing.

In a distributed environment, a data base application must maintain a copy of the index file at each workstation. When one or more users makes changes in the data base files, the application must update each workstation's copy of the index file. This puts an increased load on the network and can cause performance degradation in heavily used networks. Under some data base applications, users have to ask for a current version of the index.

A data base also requires more network access. When performing sort or report operations, the application frequently accesses the data base file on the network hard disk. Again, this increases the load and degrades performance on heavily

*“Another way
to off-load
processing
from the
personal
computer is to
use a batch
processor.”*

used networks. The solution is to centralize some of the processing done by these types of applications to reduce the network traffic and the load they create.

To get the best of both worlds, local-area networks will soon be using value-added servers — special machines designed to handle the centralized processing of specific applications.

Value-added servers offer the performance of centralized processing, but they centralize processing in a different place on the network. The network server still centralizes only file management, so network performance does not suffer.

This approach remains consistent with the local-area net's modular architecture. Initially, the additional performance of a value-added server or a batch processor is not needed in most installations. Because it is a modular component, a value-added server can be added to a system when needed. This keeps initial costs down and lets users add functions incrementally.

Data base management will be the primary application for value-added servers and will cost about as much as another workstation. A few data base servers are already available, but vendors must still write data base application programs to run on them.

Part of these programs will reside in the value-added server, which will maintain one central copy of the index file for all network users and perform all disk-intensive functions. This will decrease the network load. The user interface, command menus and other user-intensive program segments will reside at the workstation. Since a data base server is only necessary for very heavy use, users should add them as local net use increases.

Another example of a value-added server is the communications server. Both IBM and Novell have announced communications servers for their networks. Through the sharing of a centralized pool of modems and communications software, these machines will provide the entire local network with any type of asynchronous communications, including local net to local net, local net to asynchronous host and local net to remote personal computer.

Desktop publishing is another application for value-added servers that is under development. Local-area network-based desktop publishing will allow users to share and work on multiple documents. On the local network, the desktop publishing software will maintain control over the construction, formatting and printing of documents from the document server. Print servers will provide central access to network printers, and backup servers will automatically perform system backups during lulls in network use.

Users will experience an increase in overall performance because some processing will be off-loaded from the personal computer, while the network server machine will centralize file management.

Another method for off-loading processing from the personal computer is to use a batch processor. A batch processor is a high-performance personal computer, such as an IBM Personal Computer AT, that performs large sorts, data extracts or any operation that would normally tie up a personal computer workstation for a long time.

A user will be able to request the job and place it in a queue at the network server machine. The server will send these tasks to the batch processor in order of reception while the user puts his workstation to work on other jobs.

These technologies and developing local-area network components give users more options. The modular structure of local nets lets users design networks around their installation using only the components needed. Buyers don't have to waste money on what they don't need because everything isn't in one package — the system is constructed piece by piece. This gives buyers more flexibility and performance, not dramatic setup costs. □

*“MS-DOS 5.0
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the number of
users and
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a server can
support.”*

work operating system's disk access scheme. This emulation program, as well as the file server software, must also be modified for use with MS-DOS 5.0.

Novell's Netware does not run its file server as a DOS application, but provides an interface for DOS at the workstation. To take advantage of the new DOS, Novell will have to write a new interface to make the operating system compatible. Netware's file server will remain the same.



► RIGHTS AND RESTRICTIONS

What you don't know can hurt you

Staying on top of software copyright laws.

BY ARNOLD B. SILVERMAN
Special to Network World

Second in a two-part series.

During the past six years, the cloud of doubt concerning the validity of computer software copyrights has been dissipating somewhat. New laws and amendments, however, are preventing the air from clearing entirely.

Managers responsible for creating and operating business networks are confronted with the task of studying the fine print to determine what their rights are, how they can best protect those rights and how they can avoid infringing on the rights of others.

The wise course is to prepare carefully drawn agreements that clearly establish the rights and obligations of all parties involved in the creation and use of software.

Employment agreements

Because customized software is often required for certain networks, firms frequently have to employ independent contractors to develop their software.

Silverman is a partner with the Pittsburgh-based law firm of Eckert, Seamans, Cherin & Mellott.

If someone is hired on a contrac-

tual basis to write software, that person should be required to sign an agreement before any work begins. The agreement should include a work-for-hire clause as well as specifics about responsibilities, compensation, work location, deadlines and secrecy provisions.

From the employer's perspective, the most critical clauses are the ones that define the rights of ownership of intellectual property and the rights of the contractor to use that technology.

If the firm that is funding the work will also own it, the agreement should require the contractor to cooperate in obtaining the copyright and in making sure there is ownership of the copyright within the firm. In addition, restrictions should be included to prevent the contractor from performing similar work for someone else.

As part of the overall planning process, the software protection laws of other countries should be checked because they can differ dramatically among nations.

Licensing

Another important consideration for communications managers and network operators is licensing, which is a conventional means of permitting the use of software by companies that otherwise would not be authorized to use it.

A license also specifies the geographic scope of the agreement — from building to building or nation to nation — and any restrictions on making, using or selling the software. These agreements typically state whether the license is exclusive or nonexclusive.

In an exclusive license, there is a transfer of property rights. The party granting the license makes a commitment to grant no other licenses.

A nonexclusive license essentially grants immunity from related litigation. The owner is free to grant as many additional licenses as are desired.

Royalty rates are also a part of the agreement. An exclusive license might include provisions for an initial license fee, minimum annual royalties and an earned royalty, which is generally a percentage of sales or a fixed sum per unit sold or leased.

Licensees must maintain adequate records to determine the amount due.

Finally, the license specifies the term of the agreement and grounds for termination by either party. The agreement should also state whether the person who grants permission reserves the right to specify how the technology may be used.

 Continued on page 36

From page 35

Site licenses

This common form of licensing limits the use of software to one or more locations listed in the agreement. In the case of network software, it is important to ensure that the license provides enough freedom for the business to grow. The terms and conditions of any purchase or lease contract should be clear regarding future expansion.

For example, assume that a company maintains a host terminal at one site that services three other locations. It would be a serious mistake to sign an agreement that restricts software use to the current system if the company is considering expanding to additional host sites or installing intelligent terminals, mainframes or microcomputers. As a minimum protection, detailed options to expand the system's scope should be included in the contract.

Implied licenses

The best protection is an express written license between the hiring

firm and the contractor. A license, however, can also be created by implication.

An implied license may be lawfully created under certain circumstances. For instance, anyone buying authorized software has the implied right to use it. Making copies of the software for archival purposes is also permitted.

It is important, however, to use caution when sharing software with others. Trial use of software, for example, should be preceded by a written agreement that clearly disclaims any granting of licenses or rights beyond experimental use.

Label licenses

With high-volume over-the-counter software sales, it is impractical to have express licenses signed by the seller and every buyer. Therefore, software manufacturers have imposed the label license or shrink-wrap license to protect themselves.

Restrictions are printed on the label, preceded by a legend stating that breaking the seal binds the purchaser to the restrictions. Al-

Network manager from page 26

resolved, it may be that the network developer and the network manager are about to enter mortal combat.

The fight, however, may be over a dying empire.

In the good old days, corporate networks were composed mostly of in-house circuits or public switched telephone network circuits. Few companies had traffic volumes that made leased circuits economical.

As the number of companies utilizing leased facilities grew, the facilities providers (mostly common carriers) shifted more and more of their plant from usage-based revenue to fixed-fee revenue. Entrepreneurs then saw an opportunity to buy large bandwidth at a volume discount and sell it on demand at a higher, usage-sensitive price. From this, packet networks evolved. The carrier retained control of the bandwidth while providing the customer with what appeared to be switched or leased service. This let the carrier sell what amounted to the unused capacity inherent in leased circuits.

The carriers' intent was to change the cost structure so that, once again, only a few large corporations would find it economical to use leased circuits. However, this has not happened. Instead, corporations are using packet-switched networks for their private utility networks, and development is continuing toward decreasing the cost and increasing the functionality of these networks. The net result is that corporations continue to use leased circuits, but as part of their private packet networks.

The carriers, undaunted, are improving their packet networks and are also turning to other approaches, such as software-defined networks, to achieve their goal to make public networks more economically attractive for most users than private nets are. It's not hard to project the ultimate decline in

private networks. Private leased networks will continue to grow for some time as development continues, but the trend will reverse as users begin to migrate to public networks.

The time frame for this change-over is likely to be great, due to the slow development and implementation cycle of large public networks and the interval that corporations will need to develop migration plans and amortize their investment in private networks.

As corporations begin changing over to public networks, corporate network development will become almost exclusively a software activity. Most network development will be performed by network management on a day-to-day basis.

Network operations will also become essentially software-oriented. Much of what the corporate network operations department does today — monitoring and resolving problems with network equipment and facilities — will be performed by the carrier. Corporate tasks will focus on the logical network imprinted on the carrier's network.

The potential impact of new technology on corporate telecommunications structure, staff skill requirements, vendor relations and customer relations is just as critical as the technology itself. If users and vendors are not organizationally prepared to use the technology, it will not be successfully implemented.

A great deal of that preparation is political and organizational, not technical. If users don't take this opportunity to study the impact of these technological organizations on their organizations, then like Sid Caesar, they'll never know what they missed.

What's worse, they will richly deserve the organizational chaos, loss of productivity and failure of strategic plans that are bound to descend, no matter how much they try to wave them off. □

though the manufacturer might have difficulty enforcing the license under contract law, courts have stretched interpretations in some cases to enforce the label license. Illinois and Louisiana state laws have expressly made it enforceable and subject to specific conditions.

Because the label or shrink-wrap license may be enforceable, it is wise to read the label carefully before making an off-the-shelf software purchase.

Property infringement

Infringement is the use of protected property without authorization. Although copyright and trade secret laws require proof that the alleged infringer had access to the protected work and unlawfully took it, a patent can be violated even if the user of a technology is unaware that it is patented.

A general knowledge of intellectual property laws can help to prevent infringement on others' rights.

When software or a computer that uses software is being bought or leased, the user or the vendor should draw up a contract that spells out the conditions of usage. A comprehensive agreement authorizes the vendor to permit use, allows use of the software without danger of infringement and obligates the user to compensate the vendor if an infringement occurs.

Many states have adopted the

Uniform Commercial Code, a commercial statute that applies to the sale of patented products as well as to copyrighted software. According to the code, the seller guarantees the buyer against patent infringement. In cases where infringement is charged, either the intellectual property is not valid or there is no infringement.

Negotiating a license or modifying software can sometimes resolve an infringement dispute. To ignore the possibility of infringement may be a serious mistake. The penalties can be severe, the property owner might not wish to grant a license, and redesigning the software could be difficult or impossible.

Guarding your rights

The courts are stretching the application of copyright laws to software and have been giving the benefit of the doubt to owners in infringement cases.

Effective use of contracts with employment, consulting and secrecy agreements adds valuable protection for the user as well as the vendor.

Above all, thoroughly plan the use of network software from a legal perspective, and negotiate agreements that are based on the user company's existing structure and future plans. This course will minimize potential problems and help to ensure that the network operates as efficiently and competitively as possible. □

Integration from page 27

personal computers and word processors; Software Research Corp. in Natick, Mass., whose Strategic Network Environment products offer a universal file transfer network utility; San Jose, Calif.-based Communications Solutions, Inc., a Control Data Corp. company that writes Systems Network Architecture emulation software; and Wellesley, Mass.-based Pathway Design, Inc., whose products let IBM Personal Computers and compatibles communicate with IBM mainframes in MS-DOS, Unix and local-area network environments.

Value-added network vendors are introducing products that interface their public networks with intraorganizational messaging systems, particularly those running

ments.

Geisco's WPXchange software supports host-based document translation, archiving and distribution between IBM and Wang systems over the Geisco network. MCI Mail offers MCI Link, a version of Soft-Switch's software that links Profs users with MCI Mail. Western Union Corp.'s Easylink interfaces to intracompany messaging networks running on Wang VS, DEC VAX and IBM System/34, System/36 and System/38.

Due to a lack of software, these emerging software bridges and value-added network solutions have yet to challenge the established office automation vendors, but the price, performance and distributed communications capabilities of these systems will make them more competitive in the next few years.

But to what extent can manufacturers be committed to multivendor compatibility while protecting their installed system and software base? Vendors that have no stake in supporting a particular manufacturer's equipment are clearly preferable for supporting multivendor messaging environments. However, while these vendors do not necessarily support one manufacturer, they do enjoy vendor support via OEM or endorsement arrangements, and they often design their products with a particular vendor's hardware in mind.

True multivendor networking and systems integration requires understanding the systems of all vendors and a willingness to address the needs of specific applications or industry segments. □

*“These
systems will
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competitive in
the next few
years.”*

Profs and Disoss. Soft-Switch's, software resides on the IBM InformationNetwork's mainframe computers in IBM's Tampa, Fla., data center and lets users in different environments exchange docu-

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PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

1

My primary areas of activity. Circle ONE only.

I am involved in evaluating communications (data, voice and /or image) products and services:

1. for use within my own company/organization

2. for resale to other companies/organizations

3. Both

For communications , my primary responsibility is: Circle ONE only.

1. Data Communications

2. Voice Communications

3. Both

2

Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management

VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development

22. Supervisory/Staff

Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management

VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development

32. Supervisory/Staff

Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management

42. Supervisory/Staff

MIS/Data Processing

51. Management

VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation

52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

Others

75. Consultant	90. Marketing/Sales
80. Educator	95. Other _____
85. Financial Analyst	

3

Job Function

Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development

3. Implementation and/or Operation

4. Other _____

4

Which one of the following best describes the primary business activity of your organization at this location? Circle ONE only.

Consultants

11. DP/Communications Consulting Services

12. Consulting Services (except DP/Communications)

End Users

13. Manufacturer (other than computer/communications)

22. Finance/Banking/Insurance/Real Estate

23. Education

24. Medicine/Law

25. Wholesale/Retail Trade

26. Public Utility/Transportation

27. Mining/Construction/Petroleum Refining/Agriculture/Forestry

28. Business Services (excluding DP/Communications)

29. Government: Federal

30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers

42. Interconnect

43. Manufacturer Computer/Communications Equipment

44. Value Added Reseller (VAR), Systems House, Systems Integrator

45. Distributor

46. DP/Communications Services (excluding consulting)

95. Other _____

5

In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services? Circle ALL that apply.

1. Recommend/Specify	3. Approve the Acquisition
2. Identify/Evaluate Potential Vendors	4. None of the Above

6

Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
Computers			Transmission/Network Services Equipment		
01.	<input type="checkbox"/>	Micros	18.	<input type="checkbox"/>	Microwave
02.	<input type="checkbox"/>	Minis	19.	<input type="checkbox"/>	Satellite Earth Stations
03.	<input type="checkbox"/>	Mainframes	20.	<input type="checkbox"/>	Local Area Networks
Data Communications			21.	<input type="checkbox"/>	Wide Area Networks
04.	<input type="checkbox"/>	Communications Processors	22.	<input type="checkbox"/>	Packet Switching Equipment
05.	<input type="checkbox"/>	Comm./Networks Software	23.	<input type="checkbox"/>	Fiber Optic Equipment
06.	<input type="checkbox"/>	Digital Switching Equipment	Communications Services		
07.	<input type="checkbox"/>	Facsimile	24.	<input type="checkbox"/>	Packet Switching Services
08.	<input type="checkbox"/>	Modems	25.	<input type="checkbox"/>	Cellular Mobile Radio Services
09.	<input type="checkbox"/>	Multiplexers	26.	<input type="checkbox"/>	Electronic Mail
10.	<input type="checkbox"/>	Protocol Converters	27.	<input type="checkbox"/>	Enhanced Services
11.	<input type="checkbox"/>	Network Mgmt. & Control	28.	<input type="checkbox"/>	Centrex
12.	<input type="checkbox"/>	Test Equipment			
13.	<input type="checkbox"/>	3270 Controllers			
Telecommunications					
14.	<input type="checkbox"/>	PBXs			
15.	<input type="checkbox"/>	Key Systems			
16.	<input type="checkbox"/>	Central Office Equipment			
17.	<input type="checkbox"/>	Integrated Voice/Data Terminals			

7

Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in last 12 months? Check only ONE in column A.

B. which you plan to specify, recommend or approve in next 12 months? Check only ONE in column B.

A	B		A	B	
1.	<input type="checkbox"/>	Over 10 million	6.	<input type="checkbox"/>	\$100,000-250,000
2.	<input type="checkbox"/>	\$5-10 million	7.	<input type="checkbox"/>	\$50,000-100,000
3.	<input type="checkbox"/>	\$1-5 million	8.	<input type="checkbox"/>	Under 50,000
4.	<input type="checkbox"/>	\$500,000-1 million	9.	<input type="checkbox"/>	Don't know
5.	<input type="checkbox"/>	\$250,000-500,000			

8

Estimated gross annual revenues for your entire company/institution:

Circle only ONE.

1. Over \$1 billion	3. \$5 million to \$100 million
2. \$100 million to \$1 billion	4. Under \$5 million

9

Estimated number of total employees at this location:

Circle only ONE.

1. Over 5,000	3. 500-999	5. 100-249	7. 20-49
2. 1,000-4,999	4. 250-499	6. 50-99	8. 1-19



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STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

THANK YOU.

Network World

The Weekly for Leading Users of Communications Products & Services

PLEASE TAPE HERE



From page 30

computer display. Even after the image is gen-locked, it is not compatible with a video display. For instance, the graphs that are built from a typical data base manage-

ment system use 80-column text, not the 20- or 30-column text you need for video. Also, the contrast resolution is too sharp in a common computer image for video, and the colors are too bright."

► GUIDELINES

Translating graphics to video

Consider the following guidelines for use when preparing computer graphics for video transmission:

■ A slide should not contain more than one concept.

It is better to create several simple charts than one detailed chart.

■ All legends should be within the graphic frame.

Never put the legend outside the frame for video because information on the edges will bleed.

■ Line thicknesses should be trebled or more to prevent flickering of horizontal lines.

■ Lines should be rounded when

creating line charts.

■ Use a typeface such as Swiss Medium for text whenever possible.

Swiss Bold characters often bleed and become hard to read on video.

■ Simplify titles for bar and line charts, using two lines of text or less. Title lines should not contain more than 25 characters per line.

■ Word charts should not contain more than three or four bullets or points.

A single word chart should contain no more than 12 total lines.

— Jeffrey Rothfeder

"I know a lot of other companies that have avoided using computer graphics during video meetings because they complain that the quality simply is not good enough," comments Lucas.

"But for our weekly management meetings — where I need a quick turnaround of information and I need those graphics essentially on a turnkey basis — the computer graphic has been the answer to our prayers. More importantly, there are few companies where the managers are as well-informed about what the other is doing as at Mary Kay. Credit the computer graphics for this."

Lucas likes to describe her battle

to integrate computer graphics and video as "fighting on the bleeding edge of technology." The struggle, she says, has been well worth it, because in the end the technology has done what she wants it to do.

"Too many people shy away from grappling with different technologies," she says. "They're afraid to force them to conform to their needs. But if you only take the chance, you find out pretty quickly whether the technology you're working with is pliable enough. If it is, you'll succeed beyond what you imagined. If it isn't, you've probably learned an awful lot in the process that you can take with you to the next battle." □

"Lucas describes her battle to integrate computer graphics and video as 'fighting on the bleeding edge of technology.' The struggle has been worth it. In the end, the technology has done what she wants."

Wang from page 26

The decision to buy Intecom last month was in part an opportunistic move. For the past two years, Intecom has faced heavy competition. Declining sales and prices have created cash-flow problems that were magnified when Intecom lost a multimillion-dollar lawsuit. Exxon Corp., which provided much of the company's start-up capital, was eager to sell out. Wang may have seen the \$157-million deal, involving purchase of Exxon's shares and conversion of all others into Wang stock, as a bargain.

But apart from the timing, the Intecom purchase was a logical move, with major strategic advantages for both parties. While Intecom's installed base is small in numbers, with a few hundred sys-

com access to Telenova's skills at telephone set design. Intecom's sets are serviceable, but they lack sex appeal.

Intecom is developing a new PBX for the 100- to 500-line range to fill the bottom end of its product line, where the IBX has not been cost-effective. By combining this new switch with the WBX, Wang can sell digital communications to customers that have anywhere from 30 to 16,000 telephones.

The Intecom and Telenova products use differing technologies and architectures, but that should not cause difficulties. Other vendors, including Rolm and AT&T, also offer very different products to small and large customers.

Voice/data integration isn't simply technology. It also involves the attempt by major vendors to address all or most of the needs of the DP and telecommunications markets. AT&T is now trying to add DP to its recognized strengths in PBXs and long-distance networks. IBM has targeted the same markets, acquiring Rolm and investing heavily in MCI Communications Corp. Now Wang, with Intecom and Telenova and a developing portfolio of digital networking services, is attempting to enter the game.

Soon it will be impossible to be a major player in the PBX market without also providing expertise in DP and office systems. Furthermore, the window of opportunity in these markets is too narrow for most companies to gain such expertise, except through acquisitions or mergers. AT&T may have the time and resources to do both, but the jury is still out. Companies without AT&T's wealth and clout, such as Northern Telecom, must now look for strategic partners. If they fail, they may doom themselves to be also-rans in the 1990s. □

Dial-up modems from page 27

rates up to 18K bit/sec over dial-up lines, incorporates proprietary packet schemes.

The new higher speed 9.6K bit/sec V.32 standard full-duplex synchronous modems incorporate trellis-coding and echo-cancellation techniques to compensate for poor lines.

These new modems are typically used for large computer file transfers and off-peak data retrievals from data-intensive industries.

"Most vendors today are targeting large multinational users by offering CCITT support."

With fallback, a second method used to compensate for marginal telephone lines, the modem adjusts its transmission speed to accommodate existing line conditions. When lines begin to deteriorate, a modem transmitting data at 9.6K bit/sec, for example, automatically drops to a lower speed.

However, each type of modem will have various degrees of fallback when adapting to line conditions.

For instance, all 9.6K bit/sec V.32 modems only fall back to 4.8K bit/sec, while Telebit's high-speed asynchronous modem, which uses proprietary protocols, falls back in

smaller increments to lower speeds.

Incompatibility between different vendors' modems has long been troublesome for users.

International standards organizations, such as the Consultative Committee on International Telephony and Telegraphy, are helping to reduce this problem by developing standardized modem specifications.

CCITT specifications define the modem's transmission speed and mode — half- or full-duplex — as well as the fallback procedure. For instance, the V.22 bis modem operates at 2,400 bit/sec in full-duplex mode on two wires and is backward-compatible to the large installed base of 1,200 and 300 bit/sec modems.

Most vendors today are targeting large multinational users by offering dial-up modems that support CCITT V-series standards. For users, the benefits derived from worldwide standardization in dial-up modems include:

■ Low-cost access to more international networks and services.

There is a prospect of lower prices as a result of reduced marketing costs for vendors that will be able to offer one product for two markets.

■ Greater ability for technology to withstand time.

With defined fallback procedures, large investments in older installed technology, usually of a lower speed, do not become obsolete.

■ A more favorable position when negotiating with vendors for better prices and performance.

This particularly benefits multinational corporations with diversified networks, as well as users that are up against organizational policies that prohibit single-sourced equipment. □

"Companies without AT&T's clout must now find partners."

tems at most, it is composed exclusively of major corporations and large institutions, a market Wang dearly wishes to penetrate with more than word processing. With one stroke, Wang has become a major player in the PBX business.

At the same time, Wang offers Intecom a large international sales force, as well as research and development facilities the PBX manufacturer could never match on its own. Some Intecom customers are hoping that the deal will give Inte-

Network World.

“... it's targeted to the people who count —
our customers and prospects.”

David Hunter, Director of Communications, Avant-Garde Computing, Inc.

Because Networks
Must Be Managed



May 23, 1986

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A short story I thought you would like to hear:

An advertising rep for one of the more established trade journals nabbed me at a recent trade show and demanded to know why we had decided to advertise in Network World.

"It's unproven," he said. "It's redundant," he said. "It's risky," he said.

"Perhaps," I replied. "But it's also informed. Pithy. Timely. Attractive. And more importantly, it's targeted to the people who count — our customers and prospects. We're going to give it a go."

"See you," he said.

"Yes," I replied. "In Network World."

A handwritten signature in dark ink, appearing to read "Hunter".

David Hunter
Director of Communications

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NETWORK WORLD

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American Express from page 2

years ago reversed an earlier strategy of selling stock it held in First Data Resources Field Service Co. of Omaha, Neb., and began repurchasing it. American Express now owns all stock in this large DP services firm that handles, among other services, on-line credit card transaction processing for 5,000 banks and airline reservations for a number of major carriers.

These businesses, and the company's servicing of more than 22 million credit cardholders, are all what an Information Systems planner inside the company called "absolutely network-dependent."

"There's not one that isn't heavily dependent on information systems and telecommunications," he said. "Much of the product they provide is, in effect, processing."

Like Merrill Lynch, American Express is finding ways to leverage its huge investment in automation and networking by exposing customers to the widest possible range of products and services. For example, Merrill Lynch in 1985 managed a total of \$85 billion — 70% of the personal money market account business — by combining information on a customer's checking, savings, credit card and securities accounts into one computerized monthly statement and automatically sweeping idle funds into interest-bearing money market funds.

American Express Gold Card members now automatically get a personal investment account at Shearson. These success stories have since become textbook cases of how information systems and

networking are changing today's businesses.

"Being a telecommunications company is an idea that has surfaced," the source inside American Express said. "We've got all these networks. They're not all interconnected now, and I don't know that we'd know how to manage as big an interconnected network as ours would be. But you could say the possibility is there."

According to Shearson's Bruce Bernardino, the six floors that house Shearson's 2,500 traders are on what is now a stand-alone fiber-optic network. He said he didn't know of any plans to link this network to either a fiber network the company is building to connect its new DP center nearby, or to a fiber network the company may build to link other DP centers in Florida and

Arizona. But according to electrical contracting and fiber-optic cabling vendors, the network is technically capable of such interconnection.

Bernardino said the company decided to wire fiber-optic cable directly to the traders' desktops to allow for future growth.

According to George Colony, a consultant with Forrester Research in Cambridge, Mass., who has worked on the American Express account, officials there feel the wiring of the new headquarters building was expensive. "They would probably not have wired with unshielded twisted-pair [IBM Cabling] given the choice they'd have now to use shielded," Colony claimed. He said that American Express, as an IBM shop, probably made a wise decision in using the IBM cabling system. □

Sun from page 2

system, most vendors are waiting for their next major operating system releases to introduce NFS, Keating said. He also said he expects a number of NFS implementations to be announced within the next several months.

Although Sun Microsystems was one of the first vendors to tackle the problem of maintaining a consistent filing system across diverse networks, AT&T delivered its own solution this month in the form of its Remote File Sharing (RFS) capability included in Unix V, Release 3.0 ("New Unix version debuts," *Network World*, June 16).

Like Sun Microsystems' NFS, RFS is a networking service, said Laurence Brown, supervisor of Unix networking in the Systems Software division of AT&T's Computer Systems Division in Summit, N.J.

Sun Microsystems' NFS allows users to read and write to files and access directories networkwide, regardless of the type of processor or operating system used by the computers on the network, or even the

type of network itself, said John Hime, Sun Microsystems' director of product marketing.

Although NFS is integrated with Sun Microsystems' operating system, which is derived from the Berkeley 4.2 version of Unix, it does not support all Unix file system operations. Among the Unix features supported is the standard Unix permissions mode, which provides users with access to files on a file-by-file basis, Keating said.

By contrast, AT&T's RFS is specific to Unix. AT&T tightly coupled RFS with Unix for a key reason, Brown said. "The lifeblood of our business is System V applications," he said, "so it was crucial that those applications be able to run in network environments without change."

The remote file system supports all Unix semantics, such as file system semantics, as well as all Unix operations, including file and record locking and other security features. Since Unix treats peripherals as files, RFS also supports access to remote peripherals.

NFS does not, however, current-

ly provide file locking, a deficiency that can lead to overwriting of data. But Sun Microsystems has committed to delivering a network file-locking service this fall.

Although RFS is optimized for communications among Unix machines, it also supports communication between Unix and non-Unix servers, according to Brown. "You can certainly support RFS on a different machine; you just don't support the operations specific to Unix," Brown said.

Currently, AT&T provides links between Unix and MS-DOS machines through a server that runs Microsoft Corp.'s MS-Net. This server now also supports RFS. The connection to IBM's Systems Network Architecture is through IBM's SNA Distribution Services.

PC-NFS is being sold with or without Ethernet boards. In quantities of 100, PC-NFS software and documentation, along with the Ethernet boards, is priced at \$955 per unit. Software and documentation only is \$305 per unit in quantities of 100. Software alone in quantities of 100 is priced at \$255 per unit. □

Update from page 6

using the service via a satellite earth station in New York.

If approved, the additional digital satellite services and the 10% price reduction will go into effect on July 1. Companies currently using AT&T's international satellite service bear the burden of reaching the New York earth stations via domestic satellite or terrestrial facilities such as leased lines or microwave links. After reaching one of the three AT&T earth stations, a company's data is beamed up to an International Telecommunications Satellite Organization's (Intelsat) satellite.

Users subscribing to the service currently pay \$5,000 per month for the AT&T portion of the transatlantic circuit. Under the proposed rates, they would pay \$4,500 per month — a \$500 per month reduction — for the 56K bit/sec versions of the service. Users subscribing to the 5M bit/sec version currently pay \$45,000 per month for the AT&T portion of the link. Under the proposed rate revisions, they would pay \$40,000 per month. □

Utah from page 1

Telecommunications Contracts with the Bell operating company, Jorgensen said.

Utah's telecommunications department has saved an additional \$630,000 by installing twisted-pair cable, instead of twin-axial cable, throughout the Dr. Martha Hughes Cannon Building. Every workstation in the facility has been wired to support both voice and data transmission.

Jorgensen noted that 400 to 500 terminals located in various state buildings are connected through twisted-pair wire.

An additional \$34,000 was also saved with the installation of twisted-pair wire, as opposed to more expensive transmission media, in the seven-story Ogden Regional Center in Ogden, Utah.

The telecommunications department pared another \$50,000 to \$60,000 off the network's operating costs by combining the state's interstate communications traffic with the Salt Lake City-based University of Utah's network traffic.

The traffic is channeled over a T-1 line to the university's network. The calls are then sent out to the university's long-distance carriers, AT&T Communications, MCI Communications Corp. and ALC Communications Corp.

Hired its own service staff

Utah's state telecommunications department has also cut operating costs by hiring its own service and equipment installation staffs. "We used to allow the equipment vendor to install all the wiring for the device," Jorgensen recalled. Now either the telecommunications department handles this chore or an outside contractor is hired to do the work.

"Handling the installation and maintenance of our equipment means more administrative work and requires that we be more cognizant of changes in products as well as the quality of the products we receive," he explained.

The telecommunications department hired the Dallas-based consulting firm Blythe Nielsen to audit

the bills received for Centrex services and AT&T Information Systems equipment. Jorgensen said the agency determined that Mountain Bell had overcharged the state by some \$29,000.

Although this billing dispute has been settled, another apparent overbilling situation with AT&T Information Systems has yet to be resolved, Jorgensen said.

The state telecommunications director said Blythe Nielsen consultants have helped his department develop a detailed inventory of equipment, which helps all parties determine whether the state is being incorrectly billed for equipment or services.

"Before we had the inventory list, [equipment vendors] mailed the bills, and we just paid them," he said. "Now we can check the bills against the inventory."

The telecommunications department held the trump card in its negotiations with Mountain Bell for lower intrastate long-distance service and private-line rates. In 1984, Utah completed a 27-site, analog

microwave network that connects locations in close to a dozen separate counties, including Salt Lake, Davis and Utah. "[Mountain Bell] felt it was in its best interest to give us lower rates, rather than see our communications traffic diverted to what amounts to a bypass system," Jorgensen explained.

"We have reduced almost every one of our service rate structures through negotiations with our common carrier service suppliers," he added.

The \$1.3 million the department plans to save this year will not be returned to the state coffers. Instead, the savings will be used to defray the expenses state agencies pay for communications services.

Utah's telecommunications department is classified as an Enterprise Internal Service. This means the department is not funded by a line item on the state's annual budget.

The department's operating revenues are derived by charging state organizations for telecommunications services. □

Calendar

June 25-26, Hartford, Conn. — Fiber Optics in Plain English. Contact: Clifford, Inc., 83 Main St., Bethel, Vt. 05032.

June 25-27, San Francisco — Nata West, The Telecommunications Show That Simplifies It All. Contact: North American Telecommunications Association, 2000 M St., N.W., Washington, D.C. 20036.

June 25-27, San Francisco — Repositioning Your Company For Success in a Rapidly Changing Marketplace. Contact: Competitive Telecommunications Association, 120 Maryland Ave., N.E., Washington, D.C. 20002.

June 25-27, Amsterdam — Fourth Annual European Fiber-Optic Communications and Local Area Networks Exhibition. Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

June 26-27, Boston — Advanced Communications Architectures Seminar. Contact: Communications Solutions, Inc., 992 Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

June 29-July 3, Norfolk, Va. — 15th Annual ACUTA Conference. Contact: Association of College and University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588-0523.

June 30-July 1, Crystal Lake, Va. — The Postdivestiture Tariffs and Their Impact on Large Networks. Contact: The Aries Group, Inc., 1500 Research Blvd., Suite 320, Rockville, Md. 20850.

July 7-9, Washington, D.C. — De-regulated Centrex vs. PBX: Positioning Network Intelligence, User Choices and CPE Vendor and BOC Strategies. Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

July 7-11, Washington, D.C. — Electronic Warfare, C-cubed Systems. Contact: The George Washington University School of Engineering and Applied Science, Washington, D.C. 20052.

July 8-10, Baltimore — Hands-On Data Communications: An Advanced Approach. Also, July 14-16, Las Vegas, Nev.; July 21-23, Sacramento, Calif. and Chicago. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07904.

July 9-11, Boston — Data Communications I-Basic Concepts. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 9-11, Los Angeles — Hands-On Protocols. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07904.

July 9-11, New York — Fourth Annual PC Expo in New York. Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

July 10, Dallas — Manufacturing Industry Update: MAP/TOP. Contact: Infomart, Suite 6038, 1950 Stemmons Freeway, Administrative Offices, Dallas, Texas 75207.

July 10-11, Dallas — ISDN: Understanding the Technical Requirements. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 10-11, Baltimore — Data Communications and Networking for the IBM PC XT/AT and Other Compatibles. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 10-11, Chicago — Networking the IBM PC. Also, July 14-15, Orlando, Fla.; July 24-25, Morristown, N.J.; July 28-29, Boston; Aug. 4-5, Kansas City, Mo.; Aug. 11-12, Minneapolis. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 14-15, Cambridge, Mass. — Negotiating the Best Deals on Telecommunications Products. Also, July 17-18, New York. Contact: Boston University Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

July 14-16, Washington, D.C. — Deregulatory Readiness of the Telecommunications Industry. Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

July 14-16, Arlington, Va. — Network and Communications Security Workshops. Contact: Computer Security Institute, 360 Church St., Northborough, Mass. 01532.

July 14-16, Chicago — Fiber-Optic Communications. Also, Aug. 6-8, New York; Sept. 15-17, San Francisco; Oct. 20-22, Boston; Nov. 3-5, Chicago. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 14-17, Boston — The Software Trends for Executive Planning and Strategy Conference. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 15-16, New York — Inter-company Networks: EDI and Beyond. Contact: The Yankee Group Seminar Division, 89 Broad St., 14th Floor, Boston, Mass. 02110.

July 17-18, San Francisco — Telecommunications II: Integrated Voice/Data and Digital PBX. Also, August 4-5, Washington, D.C. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08705.

Advertisers Index

	Page
ADC Corporation.....	24
Anderson-Jacobson	16
Astrocom	18
AT&T Information Systems	22-23, 44
BBN	7
Bell Atlantic.....	32-33
DEC.....	12-13
Hewlett-Packard	8
Litel Telecommunications	3
NEC America.....	43
Randolph Computer	10
Wilcom Products.....	14

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- * July 21 - T-1 Multiplexers
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- * Sept. 15 - Broadband Local Area Networks
- * Oct. 20 - Baseband Local Area Networks
- * Nov. 17 - Communications Processors
- * Dec. 15 - Communications Software

Special Section

- * July 7 - Fiber Optics
- * Aug. 4 - ISDN
- * Sept. 1 - Bypass
- * Oct. 6 - Local Area Networks
- * Nov. 3 - Micro to Mini to Mainframe Connections
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HORRELLSCOPES

BY EDWARD HORRELL

In communications today, it takes more than just good business sense to survive: It requires celestial guidance.



Sagittarius, the hunter, was chosen as chairman and chief executive officer of the biggest planet in the telecommunications galaxy — AT&T.

Right now, AT&T is going through a massive reorganization and is realigning its moons. Their positions will affect the entire galaxy.

This is due, as we all know, to the release of gravitational pull by the Federal Communications Commission. Marketing restrictions that bound the giant to Earth have been eased, and AT&T now has its management team in place to orbit its competitors. Here are the Horrellscopes for the key luminaries in the AT&T firmament:

James Olson, born Dec. 3, 1925, in the second division of the sign, is aggressive and ambitious. He champions causes that may call for force. He'll steer the AT&T ship and has vowed to make it into a "world-class competitor."

But aggression by the head of this big planet might result in frustration from its slow movement. This hunter may well have his sights set too soon on game too quick to hit. But don't give up on big Sagittarius just yet.



Capricorn, the goat, was picked as president and chief operating officer.

Robert Allen, born Jan. 25, 1935, is in the first division of the sign, so he is inclined to be disciplined and to have a great capacity for admin-

istration and leadership. This will come in handy should he move to — or be promised — a more lofty position in five years when Olson is forced by AT&T's archaic retirement policy to step down. Astrologically, a Sagittarius like Olson, who has a tendency to push his luck, needs a Capricorn like Allen to give financial advice. And financial guidance is just what AT&T needs to steady its course.



Taurus, the bull, makes the best subordinate for a Sagittarius. . .

So, AT&T picked Charles Marshall, born April 21, 1929, as vice-chairman. He will direct the external affairs of the company in addition to heading personnel. Marshall may be a little out

of his hemisphere here because his division of the sign is more creative and is usually found in the arts, not in business. Taurus is known as the sign that sticks to a task — but only because it's too much effort to move onto something else.

Could the Taurus lend a new, more creative image to AT&T in the future?



Scorpio, the sting, will be vice-chairman and head up financial and strategic-planning groups.

It's a hot seat that Morris Tanenbaum, born Nov. 10, 1928, will doubtless enjoy,

because Scorpions thrive on the pressure that would crush others who don't possess such hard shells. Scorpions will listen to anyone about anything, as those close to Tanenbaum will attest. However, if there is a sign that commands Scorpio's attention in financial matters, it is Sagittarius.

Watch for Olson, the hunter, to keep guns pointed at Scorpio.

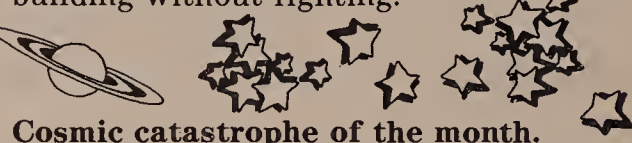


Pisces, the fish, was chosen to head the newly combined AT&T Information Systems and AT&T Communications.

Randall Tobias, born March 20, 1942, takes over at a time

when many are worried about the problems of AT&T Information Systems, which he has headed. But Tobias and AT&T itself are both fish that tend to swim away from trouble. The best boss for a daydreaming Pisces is a Sagittarius. For that reason, both Tobias and AT&T lucked out when Olson took over.

Unfortunately, all these stars don't seem to be aligned permanently for AT&T. This management team probably won't last a year. The most slippery is the fish, of course. And while they seem to be astrologically suited for their jobs, a Scorpio and a Taurus may not even be able to work in the same building without fighting.



Cosmic catastrophe of the month.

A ridiculous trend is developing in hospital communications: disposable telephones for patients.

The idea is to have patients buy inexpensive, sanitary phones when they check into the hospital. Cost? About \$15.

When the patient checks out, the phone goes along. Cost to the hospital? About \$7.

The idea is that it supposedly reduces infection, theft, vandalism and maintenance problems.

But how much of a problem has there been with bacteria and plastic telephones? Seems a 50-cent can of antiseptic would keep costs even lower in these days of escalating medical costs.

The disposable phone idea is germ-ridden.



Virgo, the maiden, is no more — Intecom, Inc. is finally married.

Even in this day and age, maidens with bad

reputations don't find good mates. But, as previously foreseen in Horrellscopes, Intecom was a company unjustly maligned. While others predicted doom for Intecom from poor sales and the settlement of a large law suit, one gallant suitor with vision saw what a profitable partner the private branch exchange company could be.

So wedding bells have rung for Wang Laboratories, Inc. and Intecom. Wang paid \$157 million for its bride, a price well worth it. This union created another giant planet in the PBX galaxy. AT&T, IBM and Northern Telecom, Inc. are other biggies that users seem to love buying from.

Wang's recent marriage has upset some of the others in the field. The green serpent has bitten those who wanted to grow, but were afraid to risk dealing with a company of questionable reputation.

And remember, June is a good month for weddings. Other discreet suitors may be smitten with moony notions, and they may decide to put rings around their relationships as well. How about it, Digital Equipment Corp. and Northern Telecom?



Libra, the scale, means that users should balance the trouble and expense of self-maintenance against the cost of securing a good warranty.

Many users now recognize that vendors often subcontract portions of their work. This is making the users wonder if they shouldn't take care of their systems themselves.

Doesn't that just make the skies rumble? All those users could be mucking around in systems they don't understand. And most of these people can't even assemble a barbecue grill without help.

For some large users who can afford to hire subcontractors, handling their own maintenance might be a viable alternative.

But most users aren't that large. They don't consider things like spare parts, which are included in vendor maintenance contracts. And what about emergency backups?

Users need to read their warranty contracts closely before deciding to service their equipment themselves or before hiring an outside contractor to do it. Most warranties state users can be charged for work that would ordinarily be free if they hadn't knocked the system out of orbit by trying to fix it themselves.

What users really need to do is compare vendor maintenance contracts at the time they purchase equipment.



Cancer, the crab, is a good thing for users to be when it comes to installing cable on telephone systems.

Users ought to be a little tougher on vendors who hire subcontractors to pull cable during the installation phase of jobs. This keeps ongoing personnel costs for vendors down and is, therefore, becoming popular.

But, even though the vendor is responsible for the subcontractor's work, it can still be shoddy work if the wrong subcontractor is employed. And nobody needs that kind of cosmic crisis.

Users should ask up front if the seller performs its own installation work. If not, the user should either hire his own installation contractor or use the contract to demand the right to approve the vendor's choice. And it might also help to know the signs of the parties involved.

Are your modems smart enough to talk to dumb terminals?

Sure, any Hayes-compatible modem can quickly link up your PC's, but what about your "dumb" terminals?

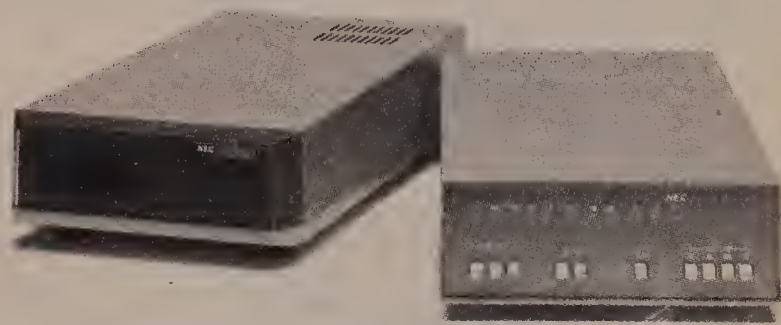
Your Hayes-compatible "smart" modem may be costing you time and aggravation as you laboriously type in long command sequences to access a mainframe.

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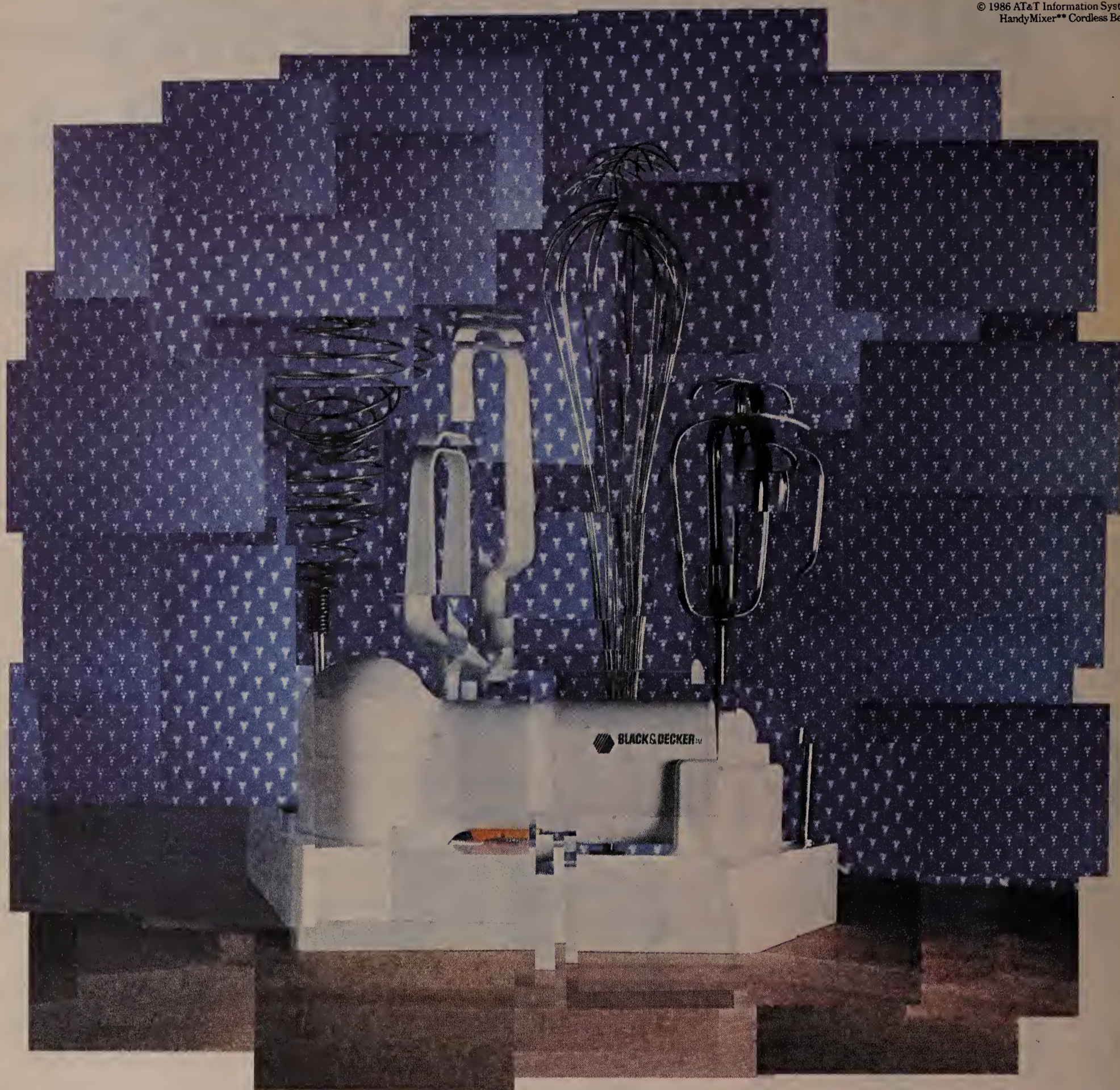
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